

3. Joint Meeting of the Board of Trustees and Investment Advisory Committee



December 12, 2018



Public Agenda Item #1.1

Call Meeting to Reconvene the Board of Trustees



December 12, 2018

Public Agenda Item #1.2

Call Meeting of the Investment Advisory Committee to Order



December 12, 2018

Public Agenda Item #2.1

Review and Approval of the Minutes of the August 29, 2018 Joint Meeting of the Board of Trustees and Investment Advisory Committee – (Action)



December 12, 2018

Questions?
Action Item



*Public Agenda Item #3.1

Actuarial Valuations

Review of Retirement Program Actuarial Valuations and Financial Status



December 12, 2018

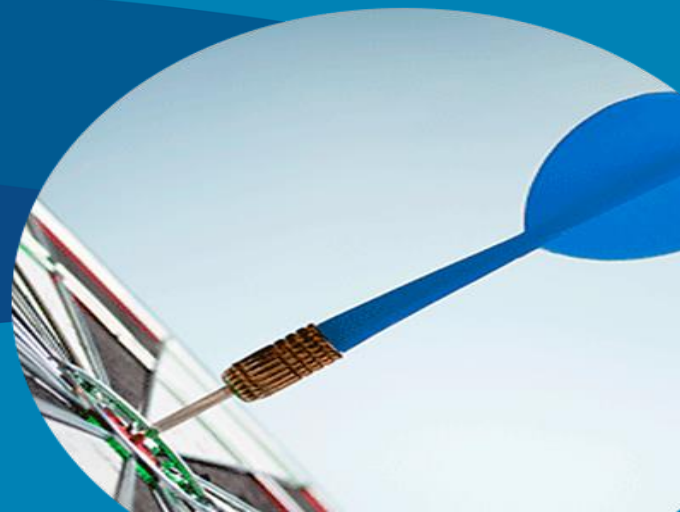
Catherine Terrell, Deputy Executive Director

Ryan Falls and Joseph Newton, Gabriel Roeder Smith

Actuarial Valuations of the ERS Retirement Funds as of August 31, 2018

Ryan Falls, FSA, EA, MAAA
Joe Newton, FSA, EA, MAAA

December 12, 2018



Agenda

- Purpose of Actuarial Valuation
- Impact of Asset Returns
- ERS Funding Valuation Results
- LECOSRF and JRS2 Funding Valuation Results
- Accounting Results at August 31, 2018

Where are we headed now?

- Outlook is similar to last year
 - Additional contributions or benefit reductions are needed to improve the projected funded status based on the current benefits
 - ERS has a projected depletion date in 2096
 - LECOSRF has a projected depletion date in 2045
 - JRS2 projected to be fully funded in 69 years
- Asset returns overcame contribution shortfalls during FY2018

Purpose of Actuarial Valuation

Purpose of Actuarial Valuation

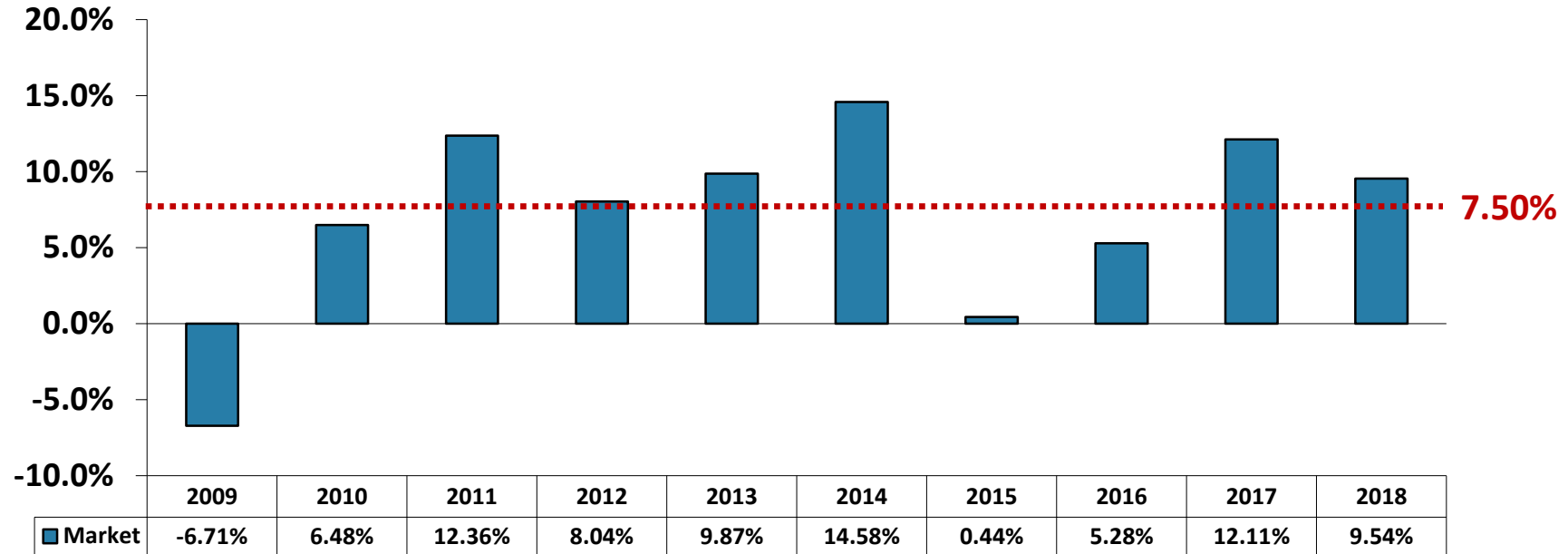
- Snapshot as of August 31, 2018 using member data, financial data, benefit and contribution provisions, actuarial assumptions and methods as of that date
- Purposes:
 - Measure the actuarial liabilities and funding levels
 - Determine adequacy of current statutory contributions
 - Provide other information for reporting
 - GASB 67/68, Comprehensive Annual Financial Report
 - Explain changes in actuarial condition of the plans
 - Track changes over time
 - Analyze future outlook

Impact of Asset Returns

Asset Experience

- Asset returns
 - Market Value (gross): 9.58%
 - Market Value (net): 9.54%
 - Actuarial (or smoothed) Value: 7.9%
- Actuarial gains on assets

Estimated Yields Based on Market Value of Assets



8.27% average compound net return (on market value) over last 5 years.

7.02% average compound net return (on market value) over last 10 years.

6.48% average compound net return (on market value) over last 20 years.

Asset Experience

- Actuarial calculations primarily based on actuarial value of assets (AVA), not market value
- Actuarial value only reflects a portion of the actual market returns over the past five years
 - Recognize 20% of the unexpected asset gain/loss each year
- Return on AVA was 7.9% in FY 2018
- \$393 million in net deferred gains, not yet recognized
 - Will be recognized over next four years
 - AVA was set equal to market value as part of the experience study last year

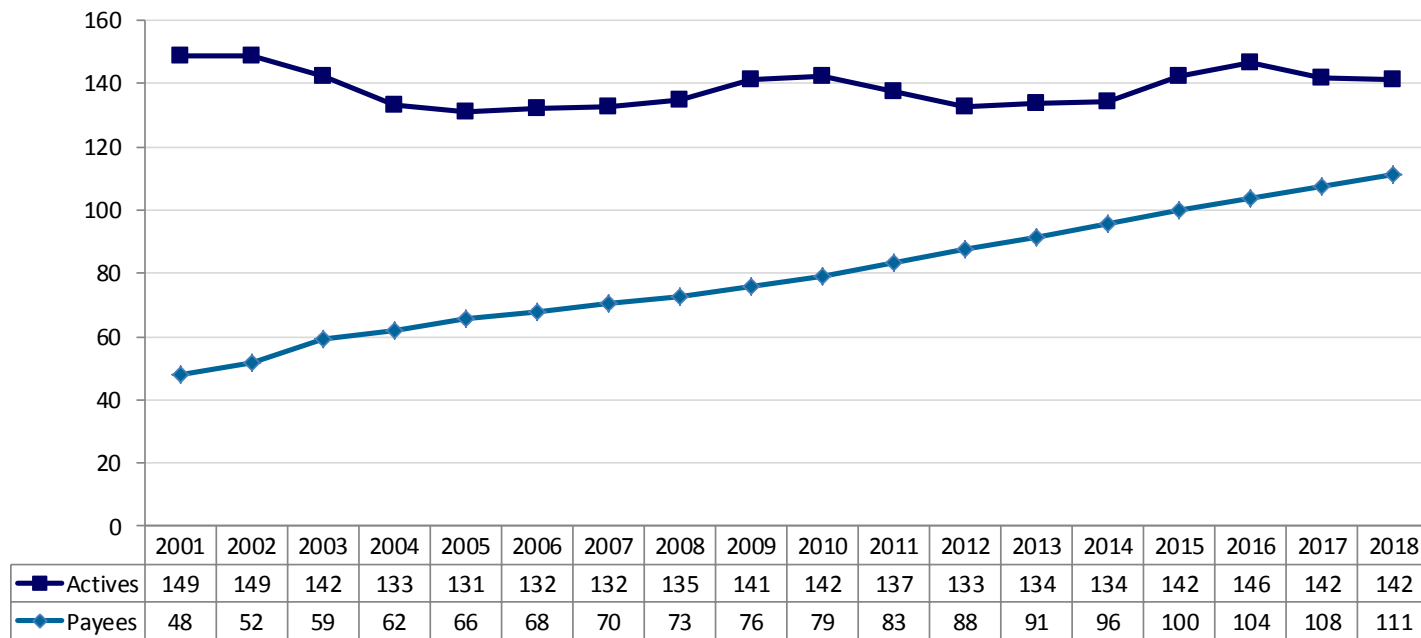
ERS

Funding Valuation Results

at August 31, 2018

Membership – Headcounts (ERS)

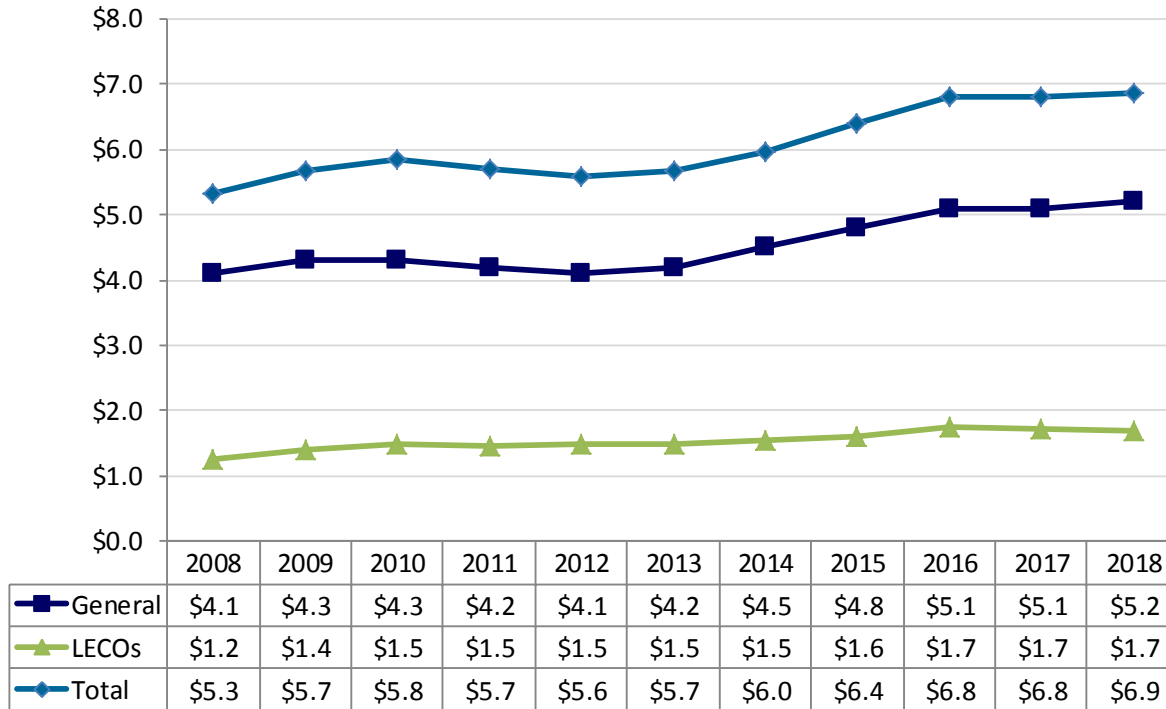
(counts in 1000's)



Active membership increase in 2015 includes approximately 7,000 new members from the elimination of the 90-day wait on September 1, 2015.

Membership – Payroll by Group (ERS)

(\$ in billions)



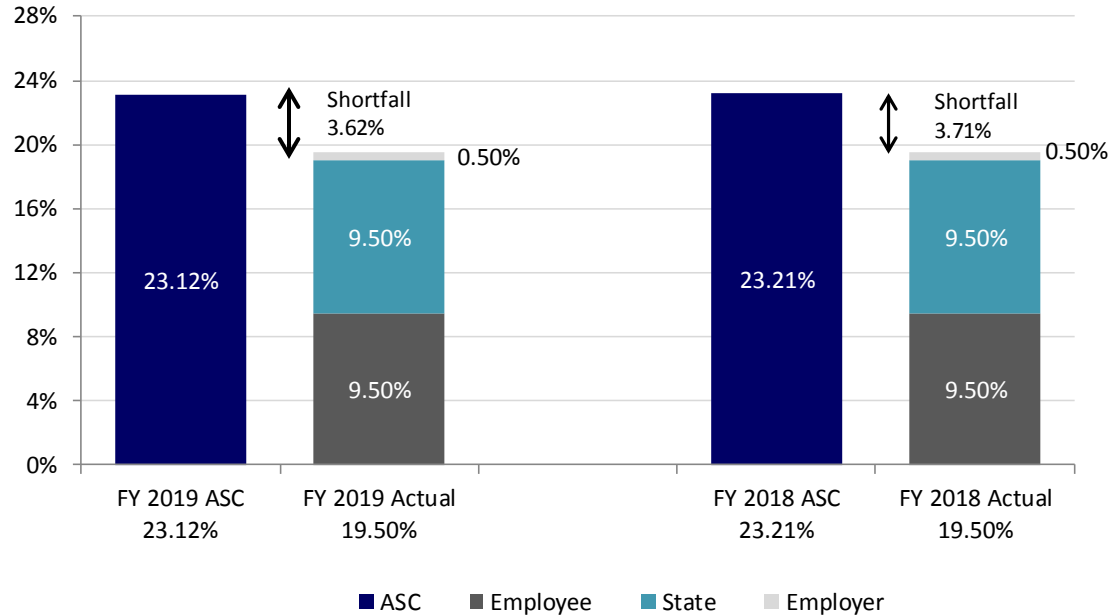
- Payroll has grown 2.6% over the past 10 years
- Projections anticipate growth of approximately 3.0%
- Includes a one-time increase of approximately 5% when the 90-day wait was eliminated in 2015

Funded Status (ERS)

(\$ in millions)

Actuarial Valuation as of August 31, 2018		
	AVA	MVA
Actuarial Accrued Liability	\$38,989	\$38,989
AVA / MVA	<u>27,360</u>	<u>27,753</u>
Unfunded Accrued Liability	\$11,629	\$11,236
Funded Ratio	70.2%	71.2%
Funding Period	Never	Never
Actuarial Valuation as of August 31, 2017		
	AVA	MVA
Actuarial Accrued Liability	\$37,630	\$37,630
AVA / MVA	<u>26,372</u>	<u>26,372</u>
Unfunded Accrued Liability	\$11,258	\$11,258
Funded Ratio	70.1%	70.1%
Funding Period	Never	Never

Actuarially Sound Contribution (ERS)



Funding Guidelines

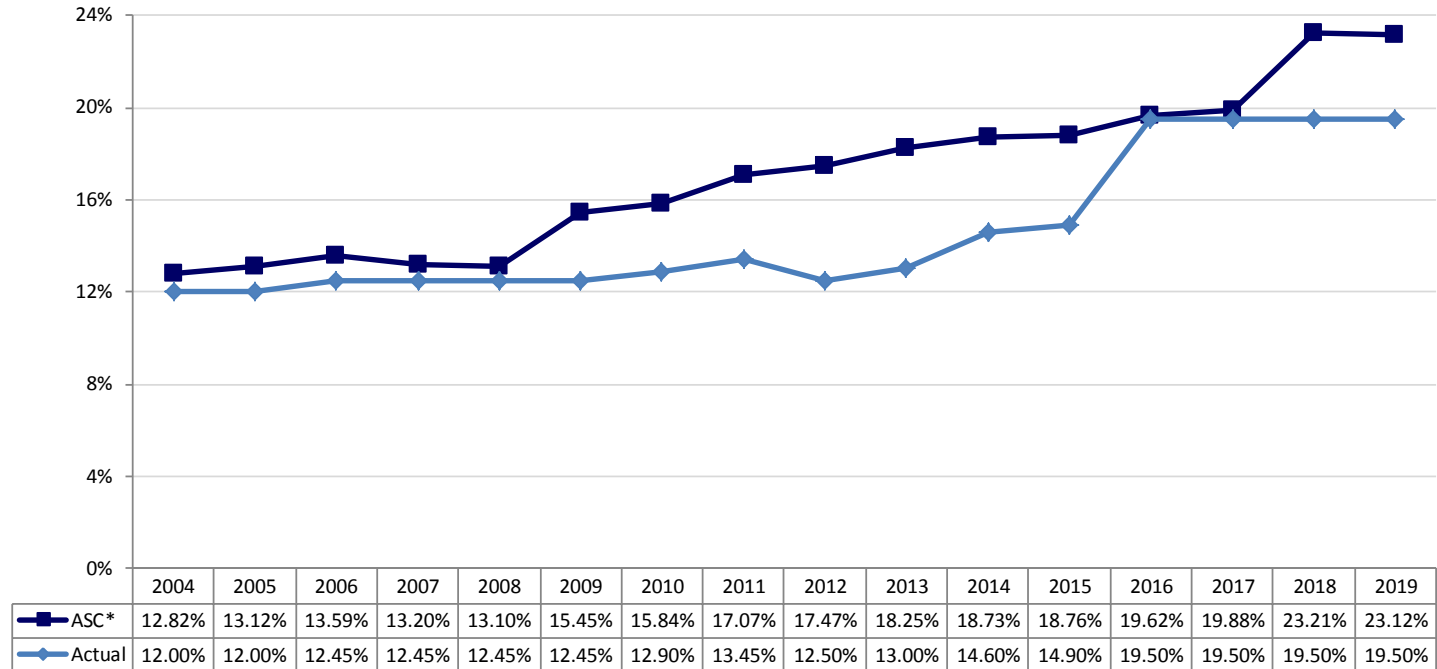
- Board approved the Pension Funding Priorities and Guidelines on May 23, 2018
- Adoption of this policy was intended to:
 - enhance communications and provide transparency to stakeholders regarding the Board's positions on plan funding strategy;
 - provide policy guidance to current and future Boards; and
 - ensure stakeholders have clear and accurate information about the Trust's funding goals and the needs of the Board in supporting sound fiduciary investment decisions

Funding Guidelines

- Policy laid out a multi-level funding period goal to gradually achieve funding on sound actuarial principles
 1. Avoid trust fund depletion,
 2. Meet current statutory standard of a 31-year funding period, and
 3. Match funding period to the average years of service at retirement (currently 22.1 years for ERF) once a 31-year funding period is achieved.
- With projected depletion date in 2096, none of the Board's funding period goals are being met

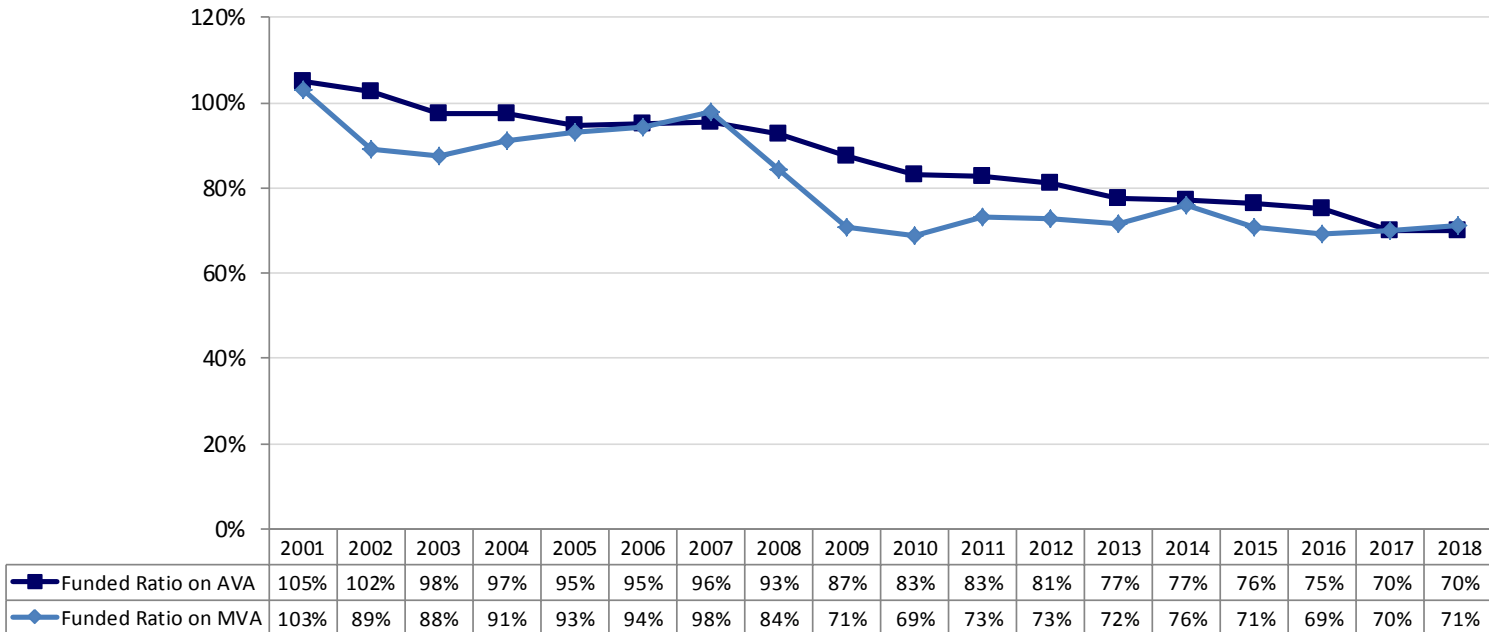
Actual vs. Actuarial Contributions* (ERS)

(% of Payroll, by Fiscal Year)



*Actuarially Sound Contribution defined as normal cost plus 31-year amortization of unfunded

Funded Ratio History (ERS)



Short-term Projections Using Alternate One-Year Investment Returns (ERS)

	August 31, 2018 Results	Market Return for 12 month period ending August 31, 2019				
		-7.5%	0.0%	7.5%	15.0%	22.5%
UAAL (\$ in billions)	\$11.6	\$12.8	\$12.4	\$12.0	\$11.6	\$11.1
Funded Ratio on AVA	70.2%	68.0%	69.1%	70.1%	71.1%	72.1%
ASC	23.12%	23.74%	23.41%	23.07%	22.73%	22.40%
Funding Period on AVA	Never	Never	Never	Never	Never	Never
Funded Ratio on MVA	71.2%	60.7%	65.8%	70.9%	75.9%	81.0%
Funding Period on MVA	Never	Never	Never	Never	59	32

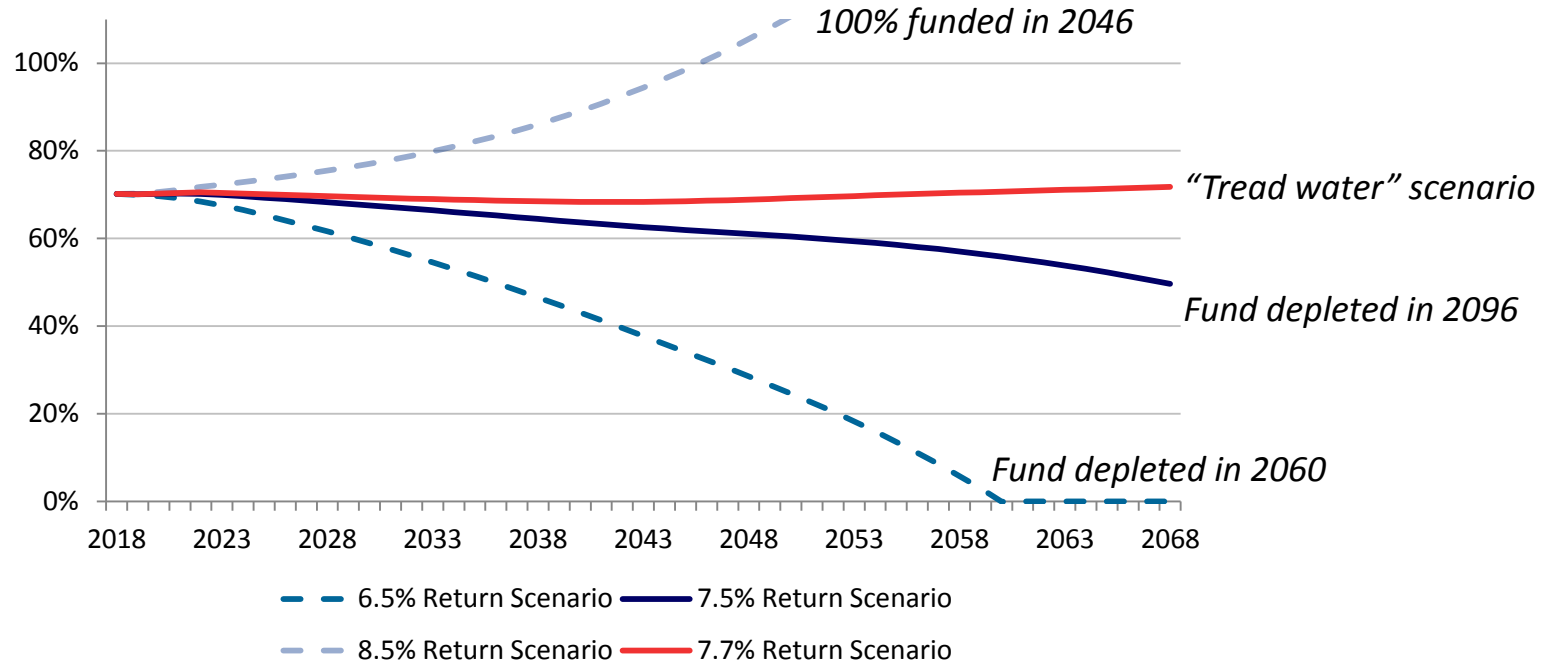
Projections assume that all assumptions are met (except asset returns, as noted) and future contributions continue at current levels.

5-Year Funded Ratio and ASC Projections (ERS)

Projection Assuming 7.5% Investment Returns			
Actuarial Valuation as of August 31,	Funded Ratio on AVA	ASC	Funding Period on AVA
2018	70.2%	23.12%	Never
2019	70.1%	23.07%	Never
2020	70.2%	23.02%	Never
2021	70.2%	22.97%	Never
2022	70.2%	22.93%	Never

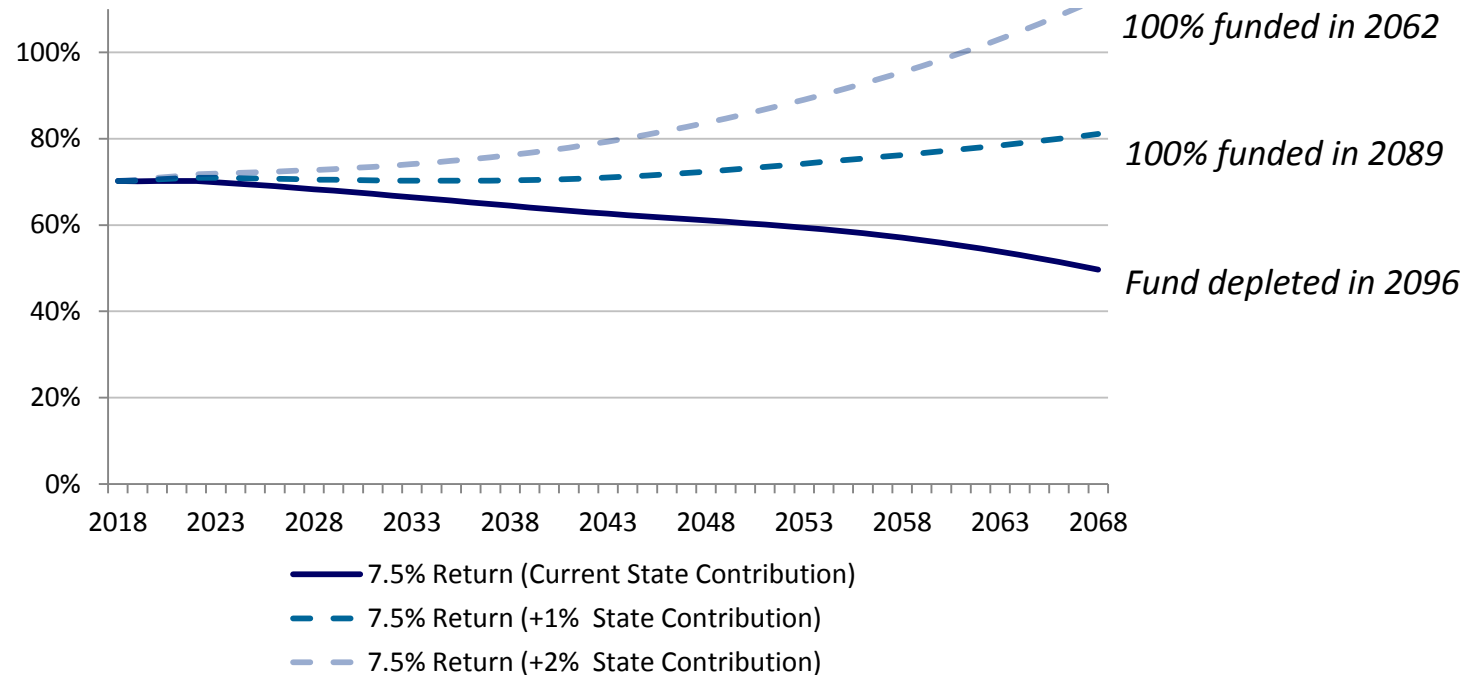
Projections assume that all assumptions are met, including an 7.5% return on the market value of assets, and future contributions continue at current levels.

Funded Ratio Projections (ERS)



Projections assume no changes to current assumptions and except actual asset returns, as noted, all other assumptions are met and future contributions continue at current levels.

Funded Ratio Projections (ERS)



Projections assume no changes to current assumptions and except State Contribution rates, as noted, all other assumptions are met.

LECOSRF and JRS2 Funding Valuation Results at August 31, 2018

LECOSRF and JRS2 Results

- LECOSRF had a reduction in funded status
 - Contributions are not sufficient to sustain the plan
 - Projected depletion date in 2045
- JRS2 had an increase in funded status
 - Given current statutory rates, the plan is projected to be fully funded in 2087

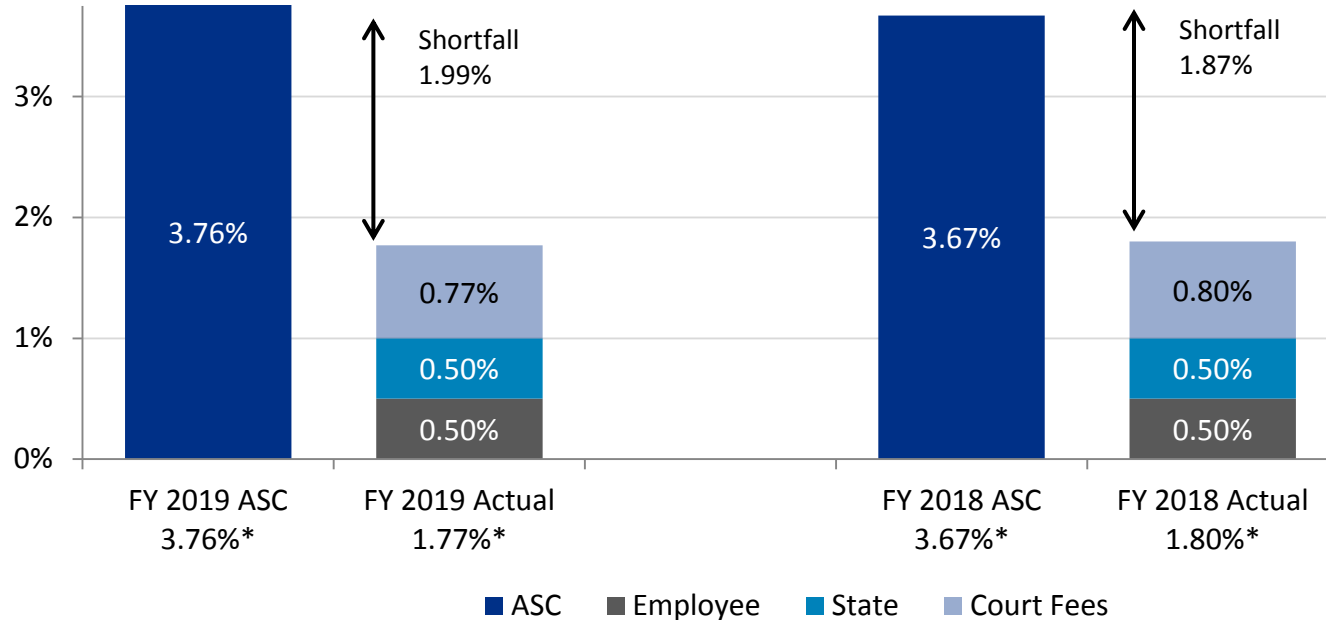
Funded Status

(\$ in millions)

Actuarial Valuation as of August 31, 2018		
	LECOSRF	JRS2
Actuarial Accrued Liability	\$1,453	\$488
Actuarial Value of Assets	<u>953</u>	<u>447</u>
Unfunded Accrued Liability	\$500	\$41
Funded Ratio	65.6%	91.7%
Funding Period	Never	69

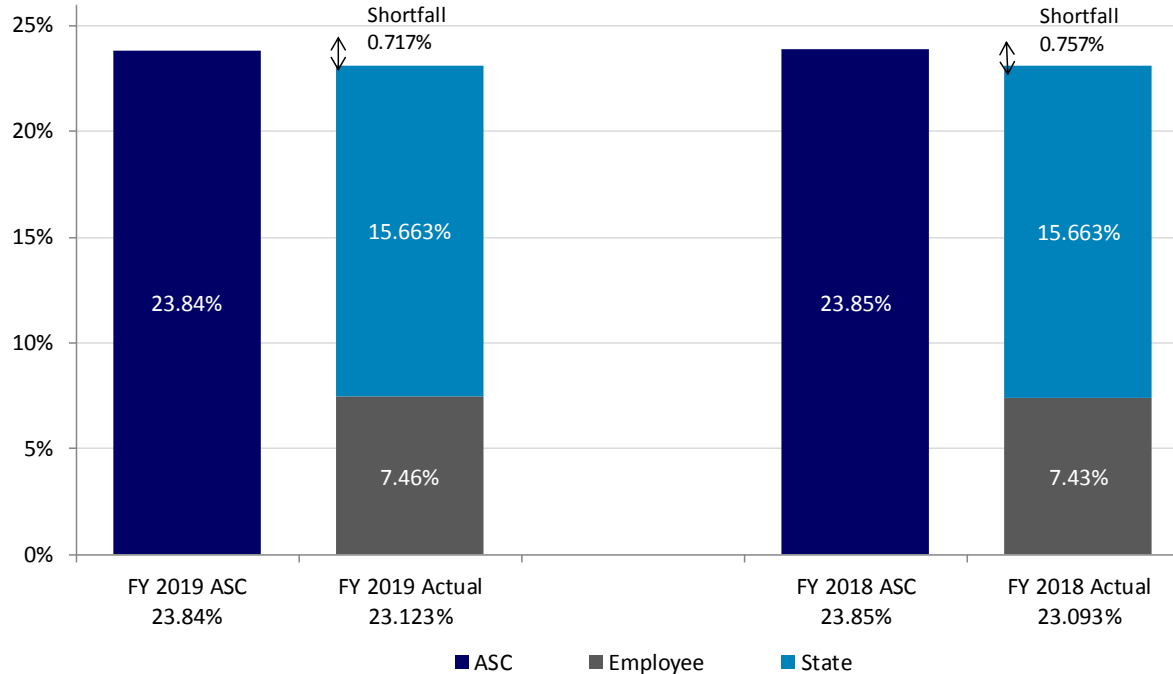
Actuarial Valuation as of August 31, 2017		
	LECOSRF	JRS2
Actuarial Accrued Liability	\$1,400	\$464
Actuarial Value of Assets	<u>924</u>	<u>421</u>
Unfunded Accrued Liability	\$476	\$43
Funded Ratio	66.0%	90.8%
Funding Period	Never	63

Actuarially Sound Contribution (LECOSRF)



**The 0.77% amount for LECOSRF is projected to be about \$18.1 million for FY19, based on a 4-year average of actual revenues. The amount of court fees received by LECOSRF is not based on a percent of payroll and is expected to decline as a percent of payroll going forward.*

Actuarially Sound Contribution (JRS2)



Funding Guidelines

- Multi-level funding period goal to gradually achieve funding on sound actuarial principles
 1. Avoid trust fund depletion,
 2. Meet current statutory standard of a 31-year funding period, and
 3. Match funding period to the average years of service at once a 31-year funding period is achieved.
- LECOSRF
 - With projected depletion date in 2045, none of the Board's funding period goals are being met
- JRS2
 - First level of the Board's funding period goal is currently being realized
 - Second level of the Board's funding period goal is not currently being realized

Accounting Results as of August 31, 2018

Accounting Valuation Results

- ERS adopted GASB 67 for plan year ending August 31, 2014
- GASB 68 measures were included in Texas state reporting starting in fiscal year ending August 31, 2016
 - State has elected to utilize one year reporting lag
 - GASB 67/68 valuation as of August 31, 2017 used for August 31, 2018 reporting
- GASB 73 outlines reporting for JRS1

Determining Discount Rate

- Discount rate used in determining the Total Pension Liability (TPL) is a blend of two rates
 - Long-term expected rate of return on pension plan investments (7.50% based on current investment policy)
 - Can be used to discount plan obligations as long as there are projected assets sufficient to pay projected plan benefits
 - Yield or index rate for a 20-year, tax-exempt general obligation municipal bond (3.69% as of August 31, 2018)
 - Used to discount plan obligations after the projected assets have been extinguished
 - JRS1 uses municipal bond rate since there are no trust assets

Accounting Valuation Results

(\$ in millions)

August 31, 2018	ERS	LECOSRF	JRS2	JRS1
Single Discount Rate (SDR)	5.69%	4.48%	7.50%	3.69%
Total Pension Liability	\$47,944	\$2,150	\$487	\$255
Plan Fiduciary Net Position	<u>27,753</u>	<u>967</u>	<u>453</u>	<u>0</u>
Net Pension Liability (NPL)	20,191	1,183	34	255
August 31, 2017				
Single Discount Rate (SDR)	5.36%	4.21%	7.50%	3.42%
Total Pension Liability	\$48,237	\$2,164	\$464	\$277
Plan Fiduciary Net Position	<u>26,372</u>	<u>924</u>	<u>421</u>	<u>0</u>
Net Pension Liability (NPL)	21,865	1,240	43	277

Summary

Summary

- Asset experience exceeded expectations
- For ERS and LECOSRF, current contribution level is not sufficient to sustain the system
 - Without an increase of contributions over the current schedule, or a reduction of benefits, the funded status will continue to decline
- Contribution rates support current plan benefits for JRS2 based on current assumptions
 - However, there is no margin for adverse deviation or response to additional cost pressures

Summary

- Scheduled to review investment return assumption again before the next actuarial valuation
 - Results currently based on 7.50% investment return assumption
 - Return expectations for peer systems and from investment professionals have continued to decline since the last ERS review in the summer of 2017

Actuarial Community Current Events

- New Risk ASOP #51
- Exposure Draft for ASOP #4
 - Actuary should determine whether the assumptions are reasonable at each measurement date
 - Strong position against Negative Amortization
 - Occurs when contributions do not cover the interest accruing on the Unfunded Accrued Liability
 - Disclosure of Investment Risk Defeasement Measure
- Exposure Draft for Public Sector Mortality Tables

Disclaimers

- This presentation is intended to be used in conjunction with the actuarial valuation reports issued in December 2018. This presentation should not be relied on for any purpose other than the purpose described in the valuation reports.
- This presentation shall not be construed to provide tax advice, legal advice or investment advice.

Questions?



*Public Agenda Item #4.1

Discussion and Training Regarding Ethics



December 12, 2018

Paula A. Jones, Deputy Executive Director and General Counsel
Dr. Robert Prentice, Department Chair and Professor, University of Texas at Austin, McCombs
School of Business

Ethics Training



- ERS policy requires employees to perform their duties in an ethical manner
- ERS works diligently to maintain and promote an ethical work environment
- The 2018 Survey of Employee Engagement (SEE) responses reflected employees' belief that ERS adheres to an ethical environment, and employees demonstrate high ethical standards in their work

Ethics Training



- Employees are encouraged to discuss issues with their supervisors, Human Resources or the Deputy Executive Director and General Counsel (DED&GC) who is also the ERS Ethics Officer
- ERS Intranet or external website are available for anonymous reports of any alleged ethics violations
- Reports go to Directors of Human Resources, Internal Audit and to DED&GC
- All reports are investigated

Ethics Training



- ERS staff is required to complete annual ethics training
 - All ERS staff completed ethics training in FY18
- The ERS Investment Policy requires that ERS Board of Trustees and IAC members receive ethics training annually

Ethics Training



- Ethics training will be presented by **Dr. Robert Prentice**
 - Department Chair and Professor, Department of Business
 - Government & Society and Business Honors Program Director
 - University of Texas at Austin, McCombs School of Business

How Many of You Are There?



Prof. Robert Prentice

Robert.Prentice@Mcombs.utexas.edu

Dec. 12, 2018



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Last year's message:

*“It’s Hard to Be the Kind of Person Your Dog
Thinks You Are”*



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I spoke about some of the factors that make it difficult to be as ethical as you want to be:

1) Social & Organizational Pressures

- The Conformity Bias



The Conformity Bias

Petrified Forest Sign: “Your heritage is being stolen. Fourteen tons of rock a year are disappearing, mostly by visitors pilfering of small amounts.”

Effect:



Petrified Forest Sign: “Your heritage is being stolen. Fourteen tons of rock a year are disappearing, mostly by visitors pilfering of small amounts.”

Effect: Pilfering tripled.



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1) Social & Organizational Pressures

- The Conformity Bias

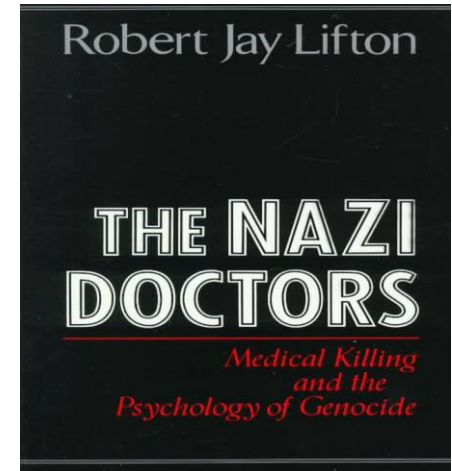
2) Cognitive Heuristics and Biases

- Incrementalism



Incrementalism

Hitler's doctors



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Hitler's doctors

*“In the beginning it was impossible.
Afterward it became almost routine.
That’s the only way to put it.”*



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Incrementalism

Enron CAO Rick Causey, a UT graduate, needed to do a deal to disguise a delay in recording losses. An executive balked.



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Causey: “Is it possible the deal is still alive?”

Exec: “No.”

Causey: “So there’s no chance of it coming back?”

Exec: “No”

Causey: “Is there even a little bit of a chance of it coming back?”

Finally, the exec took the hint and the deal was declared “undead”.



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The exec later said:

“You did it once, it smelled bad. You did it again, it didn’t smell bad.”



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1) Social & Organizational Pressures

- The Conformity Bias

2) Cognitive Heuristics and Biases

- Incrementalism

3) Situational Factors

- Time Pressure



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I emphasized problems of particular concern to leaders:

- 1) The Overconfidence Bias
- 2) The Instant Entitlement-Bias
- 3) Moral Licensing



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I emphasized problems of particular concern to leaders:

1) The Overconfidence Bias

In a recent survey of business leaders, 100% placed themselves in the top 10% morality-wise.

92% of Americans say they are satisfied with their moral character



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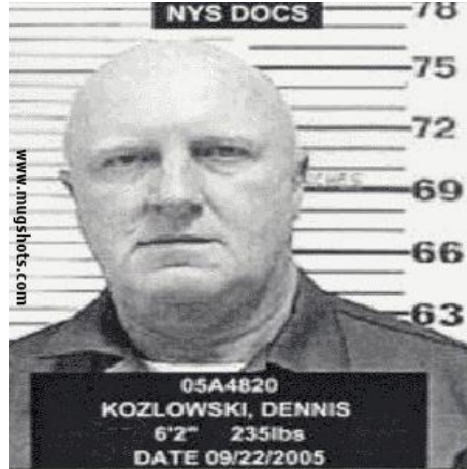


I emphasized problems of particular concern to leaders:

1) The Overconfidence Bias

2) The Instant Entitlement Bias

- The **Instant Entitlement Bias**



Dennis Kozlowski
CEO of Tyco

- \$15,000 umbrella stand
- \$6,000 shower curtain
- \$2,000,000 birthday party



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I emphasized problems of particular concern to leaders:

- 1) The Overconfidence Bias
- 2) The Instant Entitlement Bias
- 3) Moral Licensing



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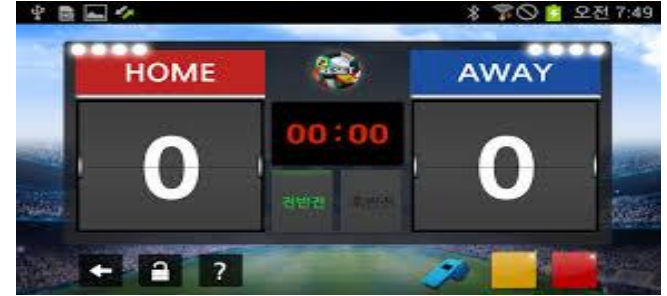


Moral Equilibrium

A. Moral Compensation.

B. Moral Licensing.

Moral Compensation + Moral License = Moral Equilibrium

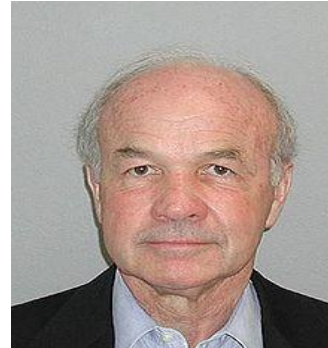


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Ken Lay was a noted philanthropist, but when he wanted to violate Enron's Code of Ethics by investing in company that did more than 80% of its business with Enron, he called suggestions of impropriety "form over substance." Rules, he said, "are important, but you should not be a slave to rules either."

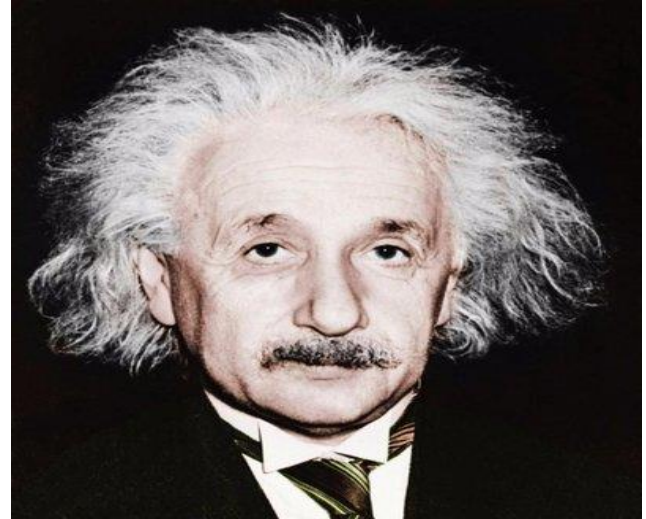


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Despite how brilliant I was....



Prof. Robert Prentice



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- *Most people want to think of themselves as good people*



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- *Most people want to think of themselves as good people*
- *Most people frequently act unethically, usually in minor ways*

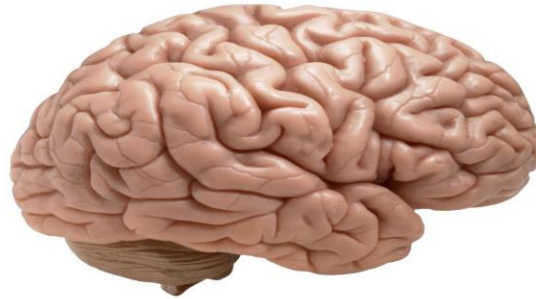


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- *Most people want to think of themselves as good people*
- *Most people frequently act unethically, usually in minor ways*
- *Our accomplice*



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IT'S NOT EASY BEING ETHICAL.



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Let me ask a question:



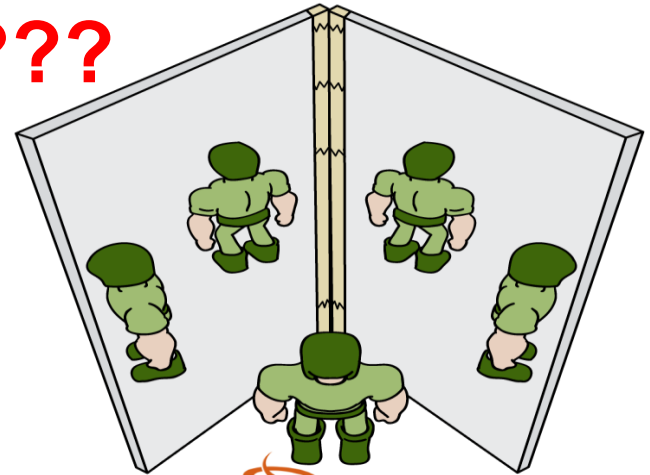
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Let me ask a question:

How many of you are there???



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I recently read
an interesting
book...

DRUNK
TANK PINK



AND OTHER UNEXPECTED
FORCES THAT SHAPE HOW WE
THINK, FEEL, AND BEHAVE
ADAM ALTER



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**Most of us are unaware of how colors
affect our judgments and actions.**



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For example,



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The University of Iowa's Kinnick Stadium



Visitors' Locker Room



And it's not just **colors** that affect
our judgments and actions—
including ethical ones--in ways we
don't realize.



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There's the you who wants to be a good person.

But there's also the you who wants to get along with other people...

The Conformity Bias



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The Conformity Bias

Let me tell you about a study....



If parking lot was dirty, ____% littered.



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If parking lot was dirty, 50% littered.



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If parking lot was dirty, 50% littered.

If parking lot was clean, 10% littered.



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If parking lot was dirty, 50% littered.

If parking lot was clean, 10% littered.

If parking lot was dirty and people's attention was called to it, 56% littered.



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If parking lot was dirty, 50% littered.

If parking lot was clean, 10% littered.

If parking lot was dirty and people's attention was called to it, 56% littered.

If parking lot was clean and people's attention was called to it, 6% littered.



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Conformity Bias

Alter says: *“These studies tell us something profound and perhaps a bit disturbing about what makes us who we are: there isn’t a single version of ‘you.’ When you’re surrounded by litter, you’re more likely to be a litterbug; when you’re walking past buildings with broken windows, you’re more likely to disrespect the property that surrounds you. These norms change from minute to minute, as quickly as a New Yorker walks from one part of the city to another.”*



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My message today:

You have an obligation to use your own independent moral judgment and to keep your behavior on the straight and narrow.

To do so, you must be wary of these hidden influences.



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There's the you who wants to be a good person.

And there's the you who wants to please your boss.

Obedience to Authority

ASK NO
QUESTIONS
AND
OBEY
AUTHORITY



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Obedience to Authority

- Milgram study

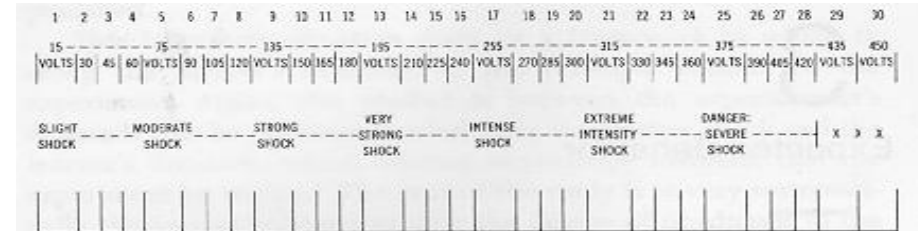
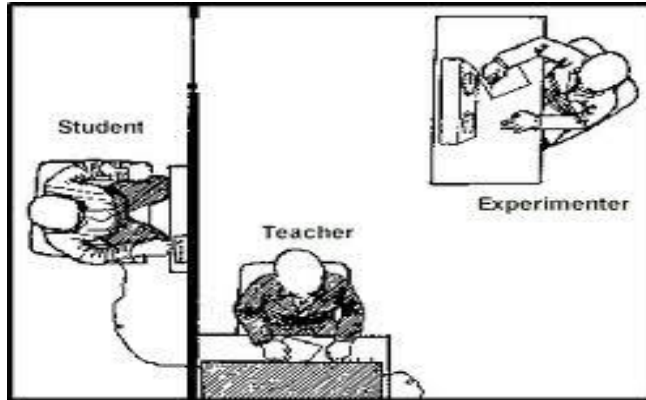


Fig. 4. Diagram of control panel.



Obedience to Authority.

- Watergate's Egil “Bud” Krogh



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There's the you who wants to be a good person.

And there's the you who takes your eye off the ball.

Inattentional Blindness



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Inattentional Blindness

Expert: Dr. Dan Simons, Univ. of Illinois



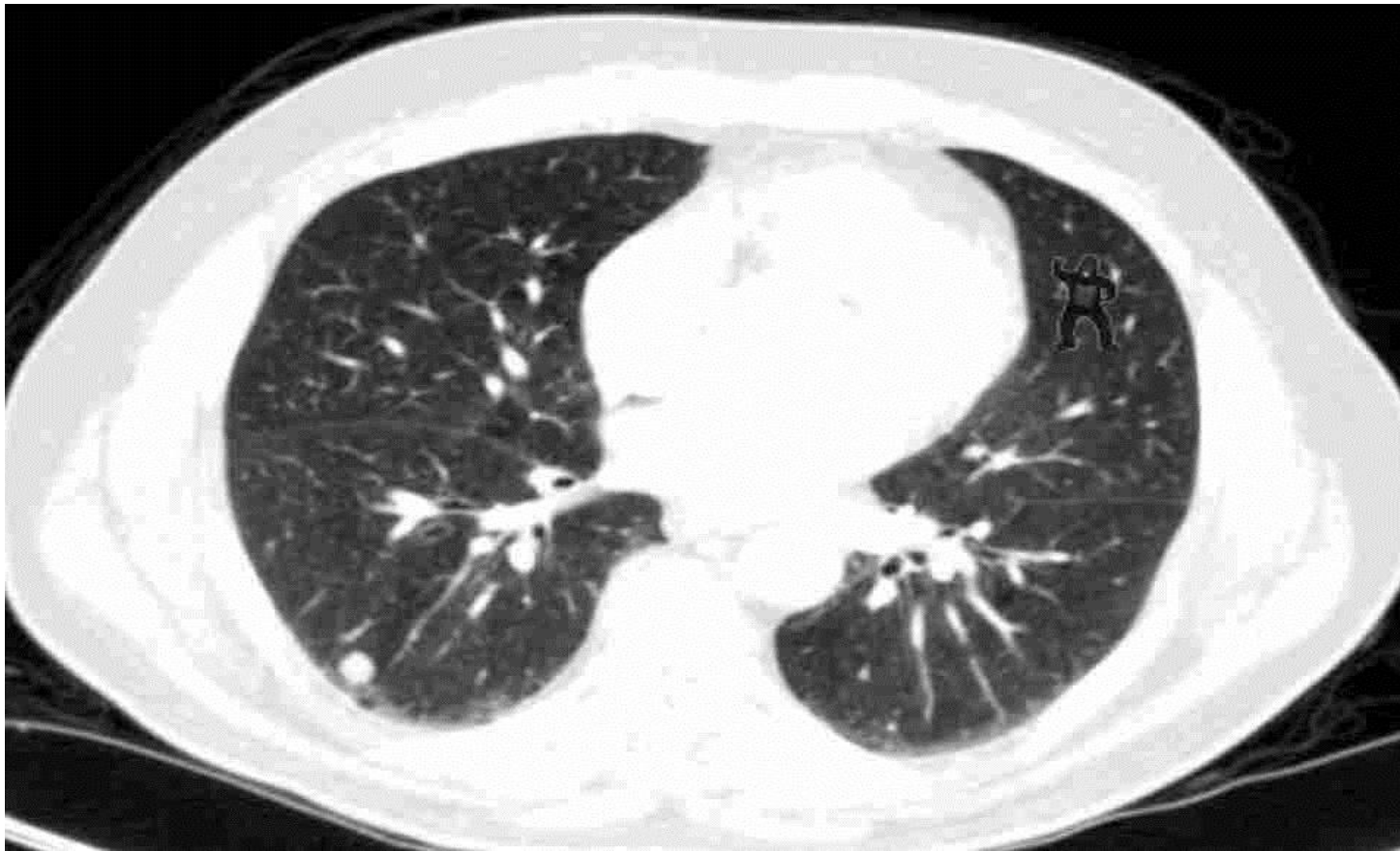
Basketball Video



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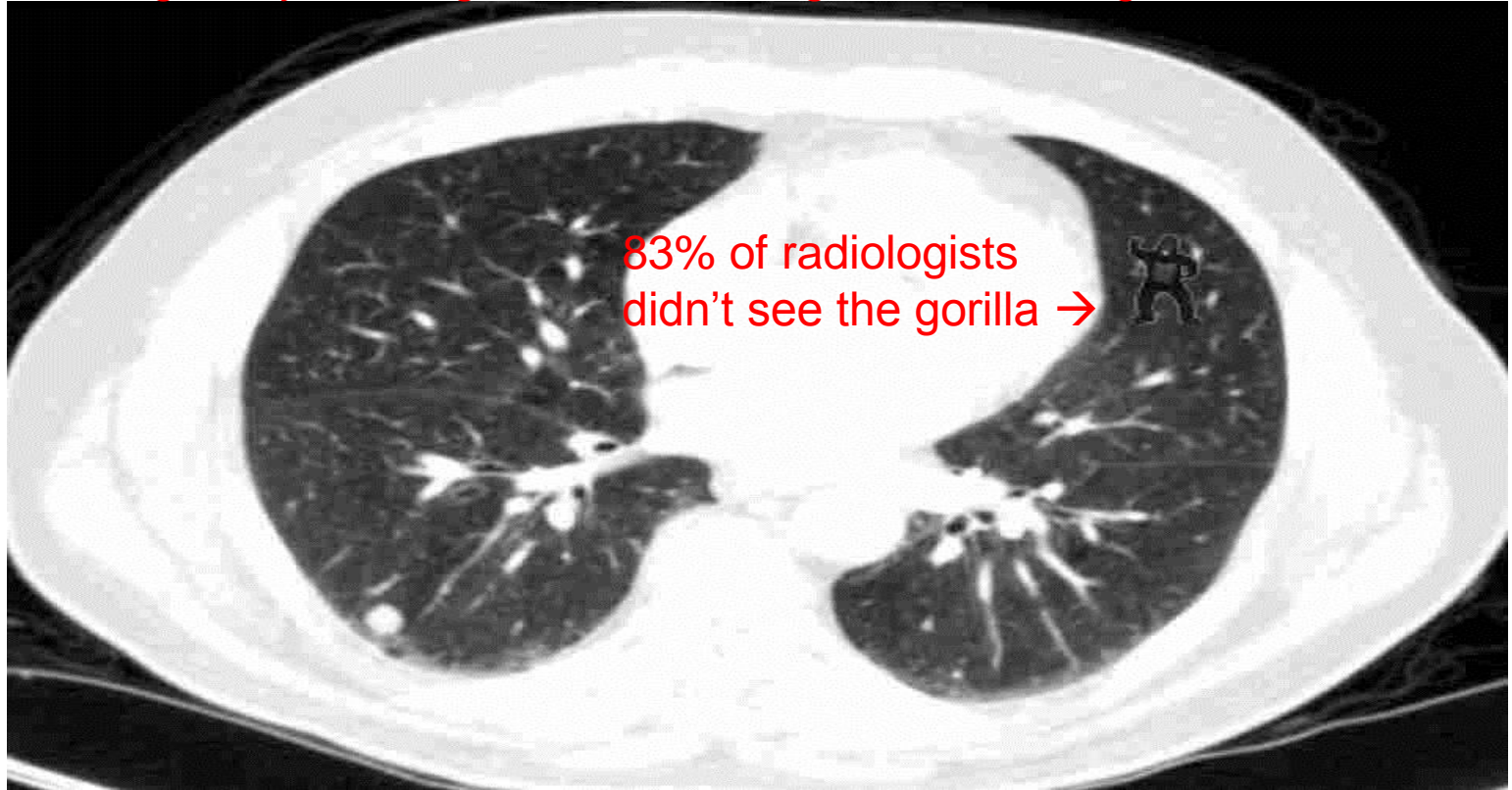


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This is a lung X-ray with a gorilla 48X as large as an average cancer nodule.



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ETHICS
UNWRAPPED™

BEYOND BUSINESS ETHICS

There's the you who wants to be a good person.

And there's the you who wants to just play your perceived role inside your organization.

Role Morality



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ROLE MORALITY

Consider:

--ABC Drug Company's most profitable drug, its internal studies indicate, causes 14-22 "unnecessary" deaths a year. Competitors offer a safe medication with the same benefits at the same price. If regulators knew of the internal study, they would ban sale of the drug.

Is it ethical for ABC to continue to sell the drug?



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Judging morality: 97% condemn



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However, when asked to play the role of
ABC directors,

Our
Board of Directors



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However, when asked to play the role of ABC directors, **100%** said ABC should continue to sell.



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Role Morality

“When people switch hats, they often switch moral compasses. People like to think they are inherently moral creatures – you either have character or you don’t. But our studies show that the same person may make a completely different decision based on what hat they may be wearing at the time, often without even realizing it.” --Dr. Keith Levitt



TEXAS McCombs

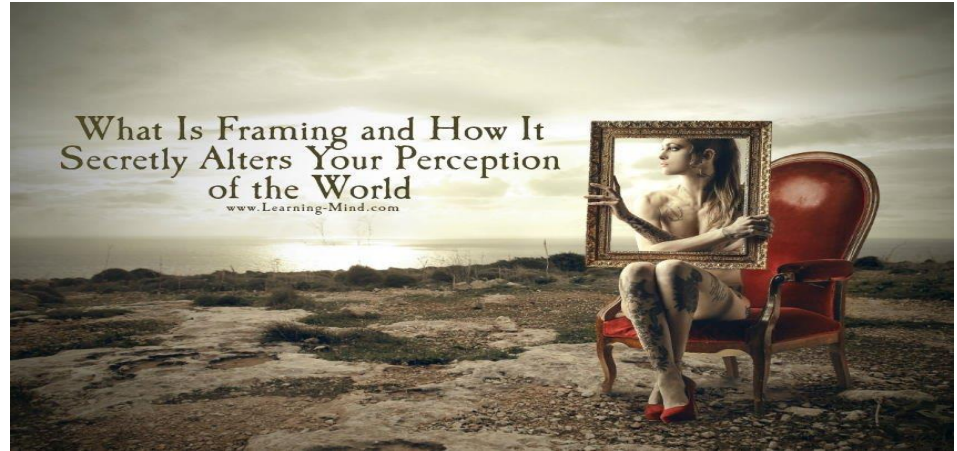
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There's the you who wants to be a good person.

And there's the you who wants to reach important goals.

Framing



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Framing

- People rate hamburgers tastier if they are labeled “75% lean” than if they are labeled “25% fat.”



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Framing.

- How did Enron frame its goals?
- How did Arthur Andersen frame its task?



Framing

- Morton Thiokol engineers unanimously recommended against launching the Space Shuttle Challenger.



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Framing

- Then their manager said: “Take off your engineer’s hats and put on your management hats.”



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Framing

- **Audiotapes from Enron energy traders:**
Greg: “It’s all how well you can weave these lies together, Shari.
Shari: I feel like I’m being corrupted now.
Greg: No, this is marketing.
Shari: OK.



Framing

DAVID GEBLER: “*MOST UNETHICAL BEHAVIOR IS NOT DONE FOR PERSONAL GAIN, IT’S DONE TO MEET PERFORMANCE GOALS.*”



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There's the you who wants to be a good person.

And there's the you who hates to lose.

Loss Aversion



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 **ETHICS**
UNWRAPPED™
BEYOND BUSINESS ETHICS

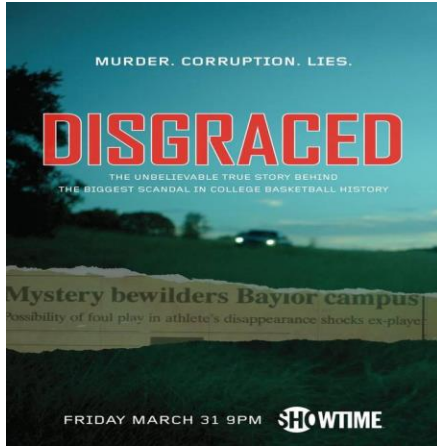
Loss Aversion

--Studies show we tend to hate losses twice as much as we enjoy gains



Loss Aversion

Dave Bliss



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Loss Aversion

Nick Leeson



Loss Aversion

Nick Leeson

--“I was ashamed of myself and what I’d become. If I was to keep this job, I had to hide the losses. I’d then do my best to get out of them, but I couldn’t admit them to anyone. To make any inroads into my losses—which now towered over 200 million pounds—I had to double up. I was drowning like an insect stuck in resin, clawing hopelessly but unable to pull myself out.”



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There's the you who wants to be a good person.

And there's the you who wants to win and to be right.

Self-serving Bias



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THE SELF-SERVING BIAS

- Affects how we collect, process, and even remember information.



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1. Collect



“The speeches I drafted ... were composed of facts filtered from the stacks of reports and intelligence that daily hit my desk. As I read these reports, facts and judgments that contradicted the British version of events would almost literally fade into nothingness. Facts that reinforced our narrative would stand out to me almost as if highlighted, to be later deployed by me, my ambassador and my ministers like hand grenades in the diplomatic trench warfare”



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2. Process

a. Capital punishment study



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2. Process

a. Capital punishment study

b. Team credit



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2. Process

a. Capital punishment study

b. Team credit

c. Westen's study: *the brain lights up*



Drew Westen
Emory Univ.

3. Remember



- People respond to incentives, even if unconsciously.

1. The more at stake; the more people respond.

- People respond to incentives, even if unconsciously.
 1. The more at stake; the more people respond.
 2. Earnings Management



- People respond to incentives, even if unconsciously.
 1. The more at stake; the more people respond.
 2. Earnings Management
 3. Doctors and CAT scans



- We are often unaware of how we are impacted [by the self-serving bias].

1. In 2000, a top AICPA official testified before the SEC, saying:

“We are professionals that practice by the highest moral standards. We would never be influenced by our own personal financial well being.”



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2. Lamar Pierce e-mail: “No doctor does a C-section for the money. You weaken your presentation greatly with urban myths and political nonsense. Your slide is an unethical transmission of physician demonization. Provide me your evidence of unethical C-sections and I will correct your misguidance.”



Dr. Lamar Pierce



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D. Studies have found that the self-serving bias affects the judgments of:

- Physicians
- Attorneys
- Auditors
- Investment Bankers
- Securities Analysts
- Scientists
- Expert Witnesses
- Judges
- Stockbrokers



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There's the you who wants to be a good person.

And there's the you who fails to see the impact your actions have on others.

The Tangible & the Abstract



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The Tangible and the Abstract

- The Ford Pinto



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The Tangible and the Abstract

- Auditors & Stock Analysts



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- Goldman Sachs whistleblower:



Noreen Harrington



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Noreen Harrington explained why she blew the whistle on late trading and market timing, saying that “prior to blowing the whistle on these practices, she viewed them as part of ‘a nameless, faceless business...in this business this is how you look at it. You don’t look at it with a face.’ That view changed, she said, when her older sister asked her for advice on her 401(K) Account. Her sister, whom Harrington characterized as one of the hardest workers she knew, was worried that the losses she saw in her retirement account would prevent her from retiring. Suddenly, Harrington ‘thought about this from a different vantage point,’ she explains. ‘I saw one face—my sister’s face—and then I saw the faces of everyone whose only asset was a 401(k). At that point I felt the need to try and make the regulators look into [these] abuses.’”



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Takeaways:

A. Good character is essential to ethical behavior.

B. But, ...cognitive limitations, social and organizational pressures, and even situational factors can cause us to screw up unless we are really careful.



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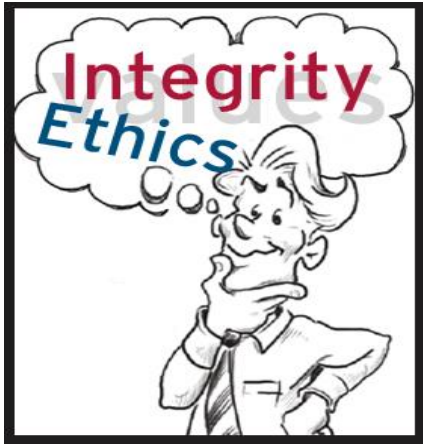
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Ethics Unwrapped

Free ethics video series brought to you by Texas McCombs
School of Business

<http://ethicsunwrapped.utexas.edu/>



Cara Biasucci,
Film Maker



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Public Agenda Item #5.1

Educational Presentation *Educational Presentation on Benchmarking*



December 12, 2018

Tom Tull, CFA, Chief Investment Officer
Sharmila Kassam, CPA, Deputy Chief Investment Officer
Steve Voss and Michael McCormick, Aon Hewitt



Benchmarking Discussion

Employees Retirement System of Texas

December 2018

Aon Hewitt
Retirement and Investment

Investment advice and consulting services provided by Aon Hewitt Investment Consulting, Inc., an Aon Company.

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Table of Contents

- **Section 1** Benchmarking Overview
- **Section 2** ERS Current Benchmarks
- **Section 3** Benchmarking Discussion/Education Timeline



Section 1: Benchmarking Overview

Purpose & Types of Benchmarks

- Benchmarks are used to measure the performance of the Total Fund, asset classes, and individual managers over various time periods and across methodologies to determine the effectiveness of implementation of an investment program
- Benchmarks are developed with the asset class portfolio construction and should be reviewed periodically
- Careful attention should be paid to appropriateness when selecting the benchmark for a given asset class, manager, or strategy

Properties of a Valid Benchmark^{1,2}

- **Specified in advance:** the benchmark is specified prior to the start of an evaluation period and known to all interested parties
- **Appropriate:** the benchmark is consistent with the manager's investment style or area of expertise
- **Measurable:** the benchmark's return is readily calculable on a reasonably frequent basis
- **Unambiguous:** the identities and weights of securities constituting the benchmark are clearly defined
- **Reflective of current investment opinions:** the manager has current knowledge of the securities or factor exposures within the benchmark
- **Accountable:** the manager is aware of and accepts accountability for the constituents and performance of the benchmark
- **Investable:** it is possible to forgo active management and simply hold the benchmark

¹ As per CFA Institute's **SAMURAI** characteristics. The criteria commonly referenced as industry standard is based on research conducted by Jeffrey Bailey and others. Mr. Bailey published an initial paper titled "Are Manager Universes Acceptable Performance Benchmarks?" in the May-June, 1992, edition of the *Financial Analysts Journal*.

² The criteria listed above mostly apply to publicly traded asset classes. Existing benchmarks for private assets (private equity, private real estate, hedge funds, etc.) lack the attributes of good benchmarks due to the inherent nature of these assets

Types of Benchmarks

- There are many types of benchmarks that can be used to analyze relative performance of an investment
 - Broad market (MSCI ACWI IMI Index)
 - Style-specific (S&P 500 Value Index)
 - Risk adjusted returns (vs. benchmark Sharpe ratio)
 - Absolute return metric (i.e. 7% return target)
 - Real return target (i.e. CPI + 3%)
 - Peer universe by investor/portfolios (i.e. Public Funds >\$1 billion)
 - Peer universe by investment strategies (i.e. HFR, Burgiss)

Benchmarking Principles

- Aon Hewitt Investment Consulting's (AHIC) benchmarking philosophy is built on research and is consistent with Modern Portfolio Theory
- We believe the benchmark for any asset class or strategy should include all, or substantially all, the investment opportunities in that particular market and be constructed without bias
- Investors should invest outside the market portfolio (or the benchmark) only when they believe they are compensated to do so
- Certain markets, mainly the private markets, where broad published benchmarks either do not exist or are of limited value
 - In these markets, appropriate benchmarks would represent the opportunity cost of the allocation or mode of implementation

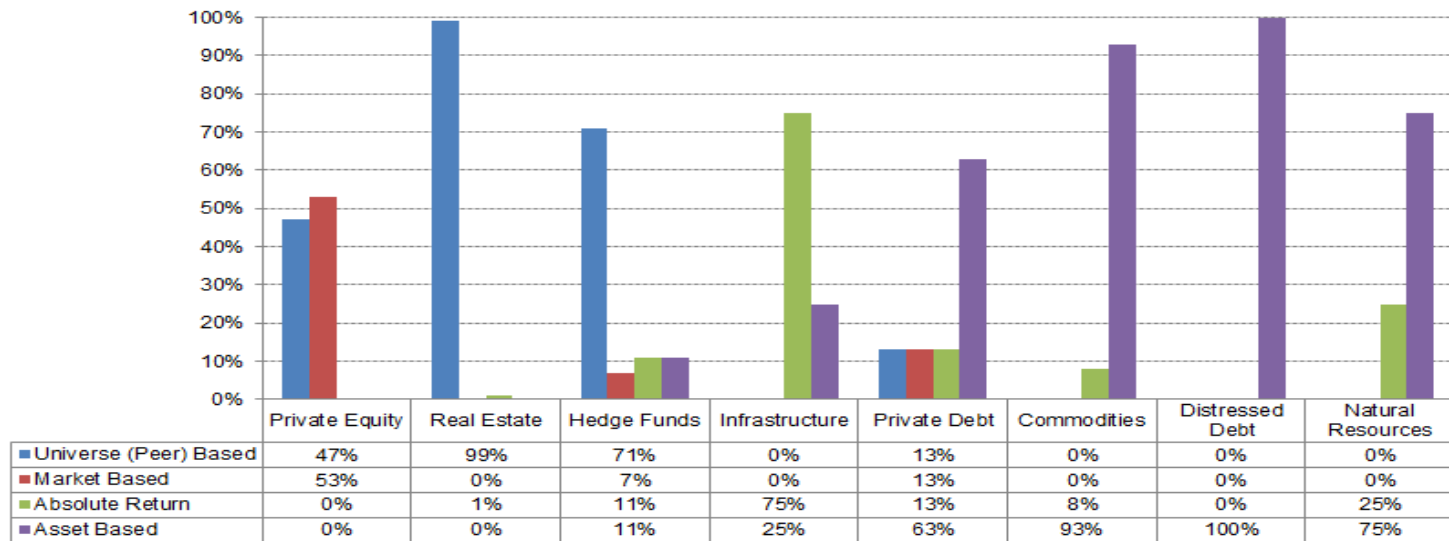
Total Fund Benchmarking

- Total Fund Policy Benchmark should be a passive representation of the blended broad asset classes included in the established asset allocation policy
- We believe that all benchmarks and policy allocations should be determined in advance
 - Deviations from the policy asset allocation and asset class benchmark should be measured and reported
 - Changes to the asset class benchmarks should flow through to the Total Fund Policy Benchmark
- Other options for Total Fund Benchmarks (mainly used for long-term periods: 10+ years):
 - Absolute Return Target (i.e. Actuarial Assumed Rate of Return)
 - Real Return Target
 - Opportunity Cost Benchmark (e.g. mix of public stocks and bonds)

Trends In Benchmarking

- Transitioning to broader investment mandates
 - All cap investment mandates within U.S. and non-U.S. equity (MSCI Investable Market Index)
 - Global equity mandate as opposed to separate U.S. equity and non-U.S. equity components
- Private equity
 - Use of peer benchmarks by investment type or investor
 - Reduced premium over public equity “opportunity cost” index
 - And utilization of a global equity index (i.e. U.S. & Non-U.S. benchmark) vs. U.S. equity index (i.e. Russell 3000 Index) as “opportunity cost” index
- Private real estate
 - Use of the NCREIF ODCI (vs. NPI) to benchmark core real estate exposure
 - NCREIF ODCI + premium for non-core real estate
 - To some extent utilization of a peer universe (challenges: depth of universe, timing of data availability, & applicability)

Alternative Investments Benchmarking in Practice



- Asset owners choose universe-based and asset class-specific benchmarks more frequently than market-based and absolute return based benchmarks
- The choice is often based more on necessity and the investors' audience than their actual performance

Source: State Street Global Services, Alternative Benchmarking: The Choices and Challenges of Performance Measurement (July 2016). Based on a survey conducted by State Street among a subset of their asset-owner clients



Section 2: ERS Current Benchmarks

ERS Benchmark Evaluation

Asset Class	Public Equity	Private Equity	Global Credit	Public Real Estate	Private Real Estate	Private Infra	Opp Credit	Rates	Cash	Abs Return
Benchmark	MSCI ACWI IMI	MSCI ACWI IMI + 300*	Barclays US HY 2%	FTSE EPRA / NAREIT	NCREIF – ODCE	CPI + 400 bps	S&P LSTA Lev Loan Index	Barclays Inter Treasury	91 Day Treasury bill	3-Month T-bill + 400 bps
Long-Term Target	37%	13%	11%	3%	9%	7%	3%	11%	1%	5%
Specified in Advance										
Appropriate										
Measurable										
Unambiguous										
Reflective										
Accountable										
Investable										

*The 300 basis point premium is over 10 years.

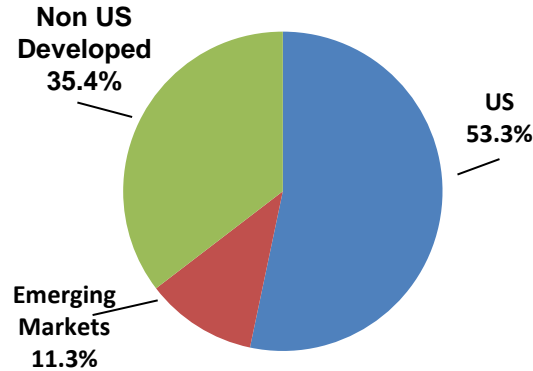
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	Property of the benchmark is not valid

Public Equity: MSCI ACWI IMI

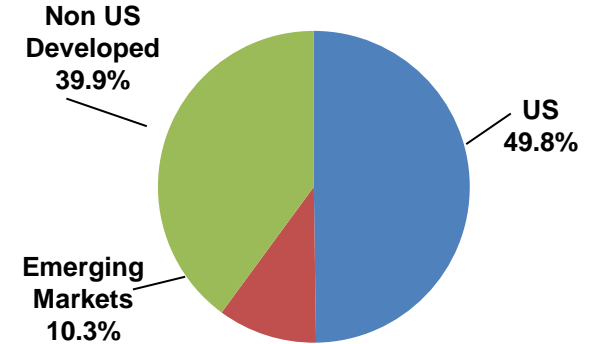
Asset Class	Public Equity
Benchmark	MSCI ACWI IMI
Long-Term Target	37%
Specified in Advance	
Appropriate	
Measurable	
Unambiguous	
Reflective	
Accountable	
Investable	
Overall View	

	Property of the benchmark is valid
	Property of the benchmark needs to be noted for discussion
	Property of the benchmark is not valid

MSCI ACWI IMI



ERS Portfolio



Benchmark: A capitalization-weighted index of stocks representing approximately 47 developed and emerging countries, including the U.S., covering 99% of the global equity investment opportunity set

Pros: Broad diversified global equity market coverage meeting the requirements of a valid benchmark

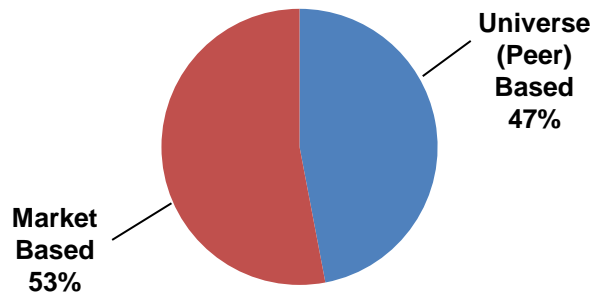
Cons: Nothing relevant to note

Private Equity: MSCI ACWI IMI (+300 bps over 10 years)

Asset Class	Private Equity
Benchmark	MSCI ACWI IMI + 300*
Long-Term Target	13%
Specified in Advance	
Appropriate	
Measurable	
Unambiguous	
Reflective	
Accountable	
Investable	
Overall View	

	Property of the benchmark is valid
	Property of the benchmark needs to be noted for discussion
	Property of the benchmark is not valid

Peer Benchmark Usage



Benchmark: Global equity with a return premium to compensate for illiquidity and expense associated with private investments (market based benchmark)

Pros: Represents the opportunity set, with a premium to compensate for illiquidity and expense

Cons: Performance will deviate from the benchmark meaningfully on a year by year basis

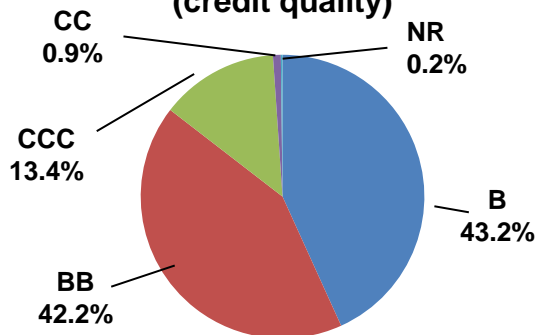
*The 300 basis point premium is over 10 years.

Global Credit: Barclays US HY 2% Issuer Cap

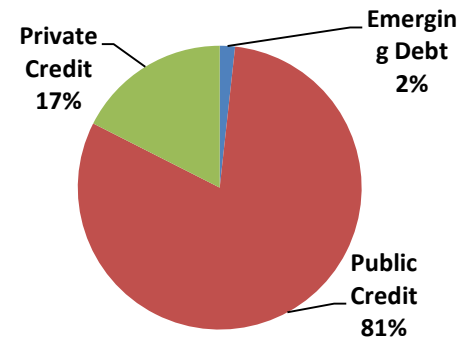
Asset Class	Global Credit
Benchmark	Barclays US HY 2%
Long-Term Target	11%
Specified in Advance	
Appropriate	
Measurable	
Unambiguous	
Reflective	
Accountable	
Investable	
Overall View	

	Property of the benchmark is valid
	Property of the benchmark needs to be noted for discussion
	Property of the benchmark is not valid

Barclays US HY 2% Issuer Cap (credit quality)



ERS Portfolio



Benchmark: A portfolio of non-investment grade fixed rate bonds, with a maximum allocation of 2% to any one issuer

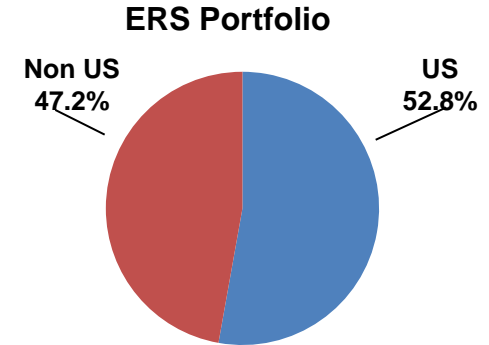
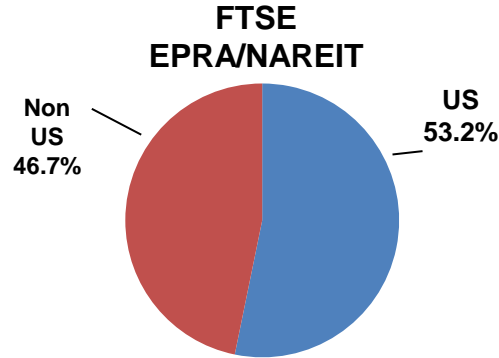
Pros: Diversified coverage of the high yield market, with a 2% cap per issuer

Cons: Performance may deviate from broad high yield market due to relative performance of large issuers

Public Real Estate: FTSE EPRA / NAREIT (Developed)

Asset Class	Public Real Estate
Benchmark	FTSE EPRA / NAREIT
Long-Term Target	3%
Specified in Advance	
Appropriate	
Measurable	
Unambiguous	
Reflective	
Accountable	
Investable	
Overall View	

	Property of the benchmark is valid
	Property of the benchmark needs to be noted for discussion
	Property of the benchmark is not valid



Benchmark: A broad representation of listed real estate companies and REITS in 21 developed markets, the index constituents are free-float adjusted, liquidity, size and revenue screened

Pros: One of the broadest, most comprehensive, REIT market Indexes

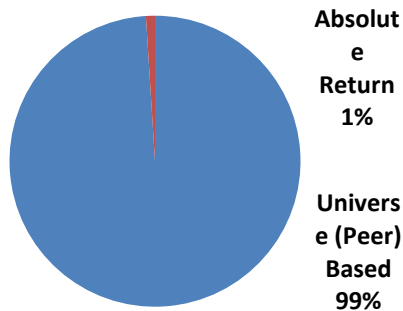
Cons: Includes REITS from only developed regions

Private Real Estate: NCREIF – ODCE

Asset Class	Private Real Estate
Benchmark	NCREIF – ODCE
Long-Term Target	9%
Specified in Advance	
Appropriate	
Measurable	
Unambiguous	
Reflective	
Accountable	
Investable	
Overall View	

	Property of the benchmark is valid
	Property of the benchmark needs to be noted for discussion
	Property of the benchmark is not valid

Peer Benchmark Usage

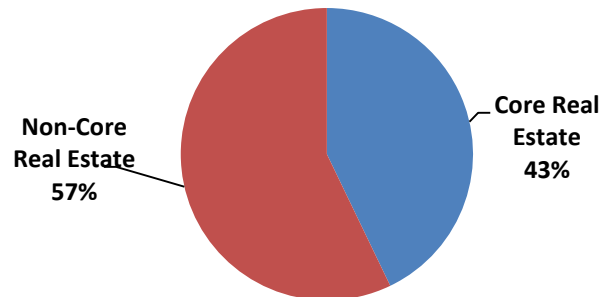


Benchmark: Index representing investment returns of an aggregate of open-end, commingled equity real estate funds with similar core investment strategies (peer benchmark)

Pros: Includes leverage and is net of fees

Cons: Consists of core real estate investments, and is not reflective of other real estate segments

ERS Target Portfolio

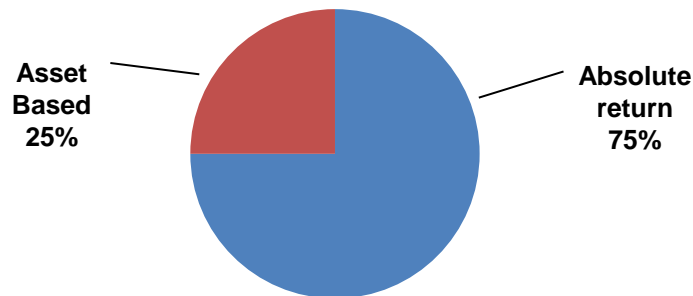


Private Infrastructure: CPI + 400 bps

Asset Class	Private Infra
Benchmark	CPI + 400 bps
Long-Term Target	7%
Specified in Advance	
Appropriate	
Measurable	
Unambiguous	
Reflective	
Accountable	
Investable	
Overall View	

	Property of the benchmark is valid
	Property of the benchmark needs to be noted for discussion
	Property of the benchmark is not valid

Peer Benchmark Usage



Benchmark: Inflation + a real return benchmark (absolute return benchmark)

Pros: Appropriate for infrastructure as a primary characteristic and role is to act as inflation-hedge

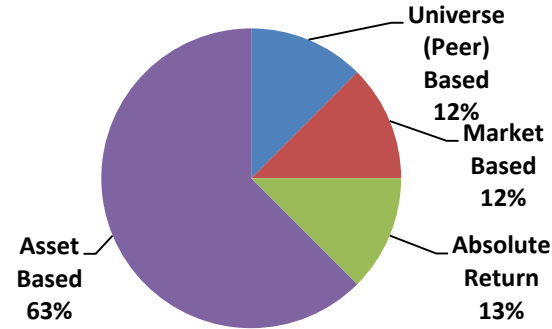
Cons: Not reflective of the actual underlying investments

Opportunistic Credit: S&P LSTA Leveraged Loan Index

Asset Class	Opp Credit
Benchmark	S&P LSTA Lev Loan Index*
Long-Term Target	3%
Specified in Advance	
Appropriate	
Measurable	
Unambiguous	
Reflective	
Accountable	
Investable	
Overall View	

	Property of the benchmark is valid
	Property of the benchmark needs to be noted for discussion
	Property of the benchmark is not valid

Peer Benchmark Usage



Benchmark: An index representing the dollar denominated investable senior loan market with an initial term greater than one year

Pros: Diversified coverage of the Bank Loan market and generally reflective of private credit

Cons: Does not reflect a return premium for illiquid securities

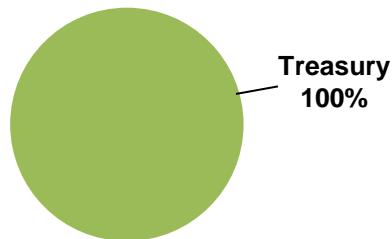
*In the future, the benchmark will have a premium added as appropriate for portfolio construction.

Rates: Barclays Intermediate Treasury Index

Asset Class	Rates
Benchmark	Barclays Inter Treasury
Long-Term Target	11%
Specified in Advance	
Appropriate	
Measurable	
Unambiguous	
Reflective	
Accountable	
Investable	
Overall View	

	Property of the benchmark is valid
	Property of the benchmark needs to be noted for discussion
	Property of the benchmark is not valid

Barclays Intermediate Treasury Index

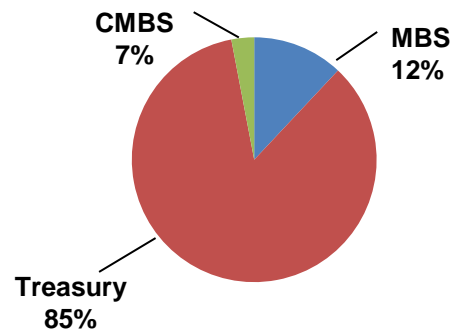


Benchmark: A market capitalization weighted index representing intermediate-term fixed-rate nominal debt obligations issued by the U.S. Treasury

Pros: Reflects desired risk and liquidity profile

Cons: Reflective of government issuance, single issuer, and does not include CMBS/MBS

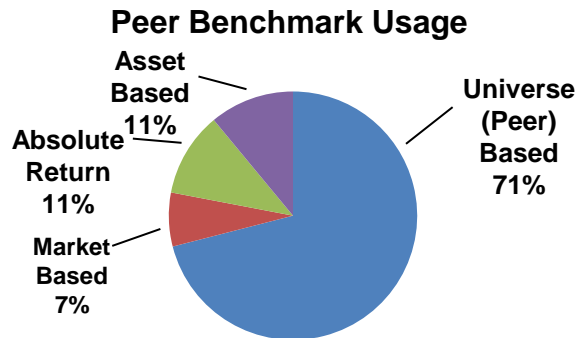
ERS Portfolio



Absolute Return: U.S. 3-Month Treasury bill + 400 bps

Asset Class	Abs Return
Benchmark	3-Month T-bill + 400 bps
Long-Term Target	5%
Specified in Advance	
Appropriate	
Measurable	
Unambiguous	
Reflective	
Accountable	
Investable	
Overall View	

	Property of the benchmark is valid
	Property of the benchmark needs to be noted for discussion
	Property of the benchmark is not valid



Benchmark: Absolute return target over Treasury returns (absolute return benchmark)

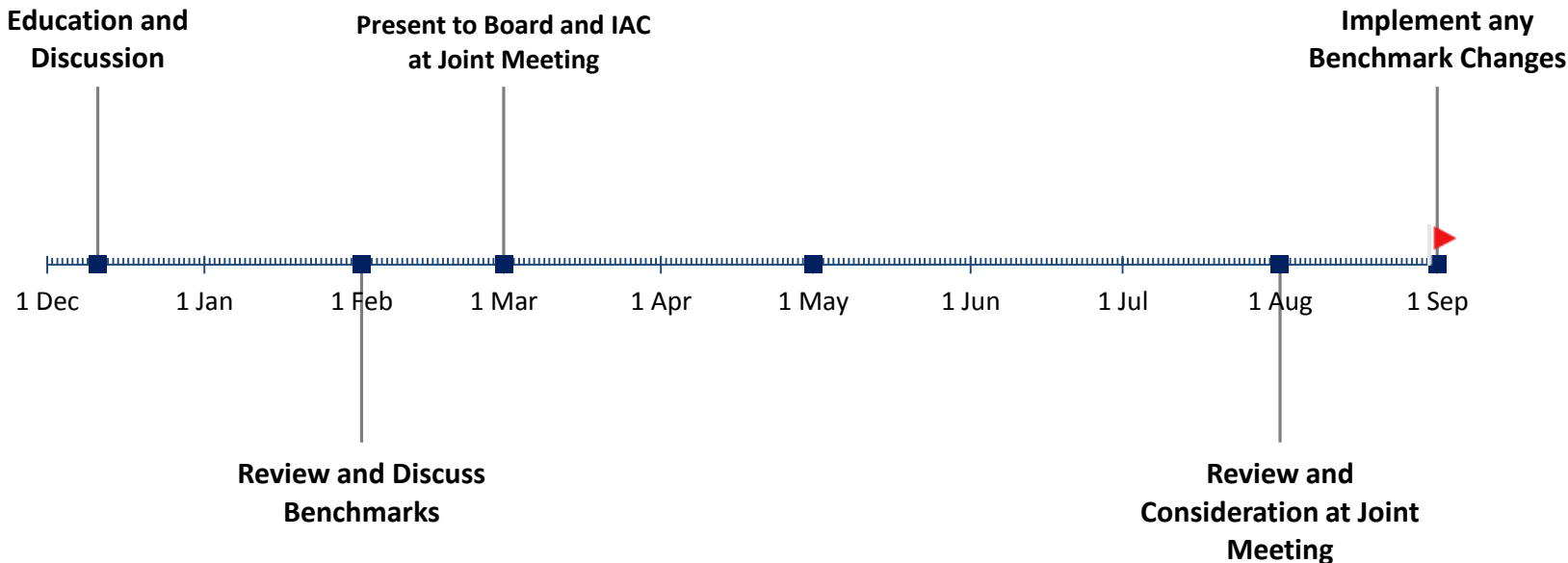
Pros: Reflects the targeted return of the investment strategy

Cons: The benchmark is not reflective of the portfolio, and relative performance will likely be impacted by market beta



FY 2019 Benchmark Discussion/Education Timeline

Benchmark Overview



- Over the next year, each asset class benchmark would be reviewed in additional detail to affirm appropriateness and consider potential changes
 - Any changes would be implemented at the beginning of the next fiscal year

Questions?



*Public Agenda Item #6.1

Review of Investment Performance for the Third Calendar Quarter of 2018



December 12, 2018

Sharmila Kassam, CPA, Deputy Chief Investment Officer
Steve Voss and Michael McCormick, Aon Hewitt

ERS Trust Fund Dashboard

Performance

Fund	<u>CYTD</u>	<u>FYTD</u>
Performance:	4.4%	0.1%
Benchmark:	3.1%	0.0%
Excess Return:	1.3%	0.1%
3-Yr Tracking error	1.57	

Largest Contributors (quarter):

- Outperformance of the private real estate component

Largest Detractors (quarter):

- Underperformance of the global public equity and private equity components

Profile

Market Value at 9/30/18:

\$28.9 Billion

Actuarial Accrued Liability 8/31/18:

\$39.0 Billion

Retirees and Beneficiaries 8/31/18:

111,361

Retirement Payments Annually 8/31/18:

\$2.4 Billion

ERS Trust Funding Ratio 8/31/18:

70.2%

Compliance

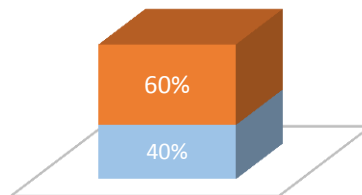
Asset Allocation Compliance: Yes

Tracking Error Compliance: Yes

Investment Policy Compliance: Yes

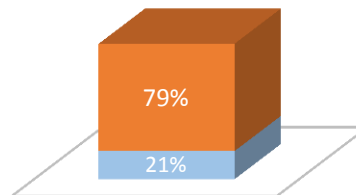
MANAGEMENT

■ External ■ Internal



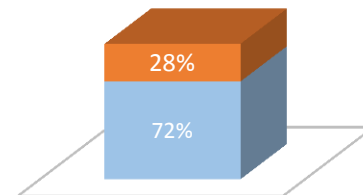
ALLOCATION

■ Risk Reducing ■ Return Seeking



LIQUIDITY

■ Liquid ■ Illiquid

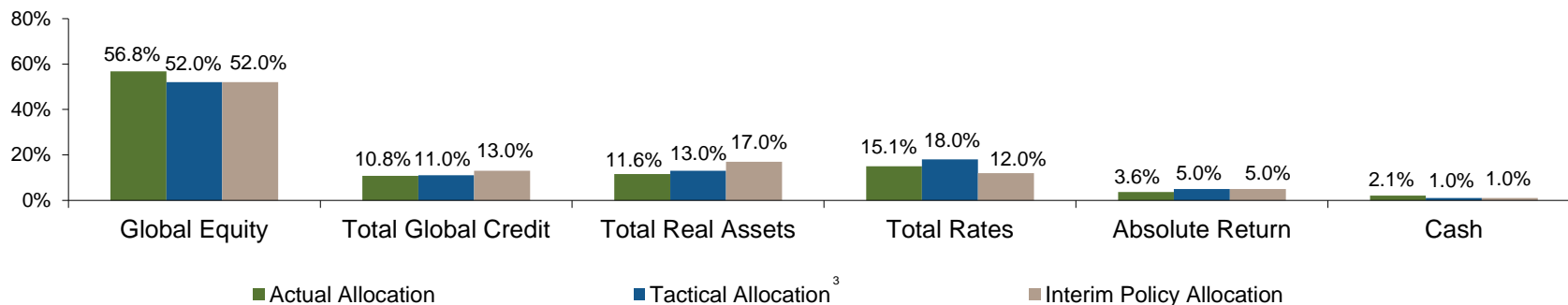


Total Fund: Asset Allocation

Summary of Cash Flow

	1 Quarter	Year To Date	Fiscal YTD	1 Year	3 Years	5 Years
Total Fund						
Beginning Market Value	28,338,380,520	28,554,907,251	28,846,610,351	27,797,322,053	24,533,633,307	24,510,900,746
+ Additions / Withdrawals	-124,011,790	-875,137,423	45,594,896	-1,142,598,466	-3,310,052,801	-5,598,129,384
+ Investment Earnings	709,016,575	1,243,615,477	31,180,058	2,268,661,718	7,699,804,800	10,010,613,943
= Ending Market Value	28,923,385,305	28,923,385,305	28,923,385,305	28,923,385,305	28,923,385,305	28,923,385,305

Employees Retirement System of Texas - Quarterly Asset Allocation Including Risk Management vs. Policy Target as of 9/30/2018



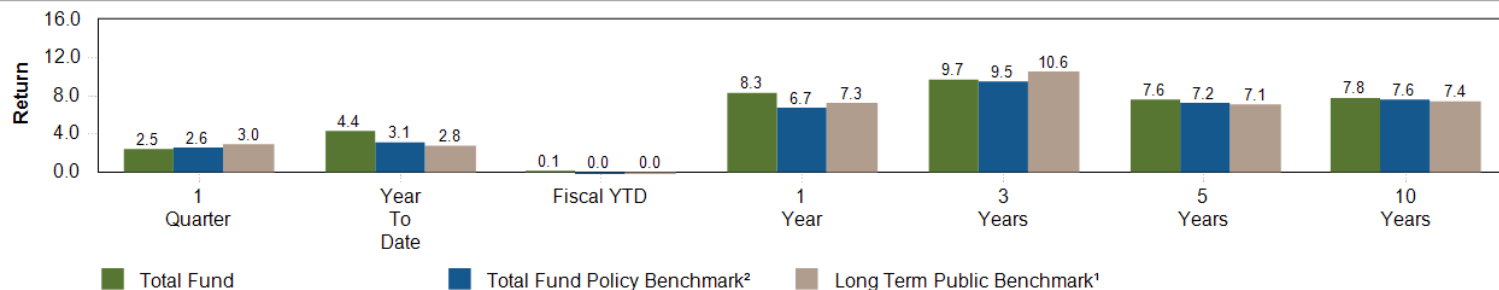
¹ All returns contained in this report are shown net of investment management fees. All returns longer than 1-year are annualized.

² Due to rounding throughout the report, percentage totals displayed may not sum to 100%.

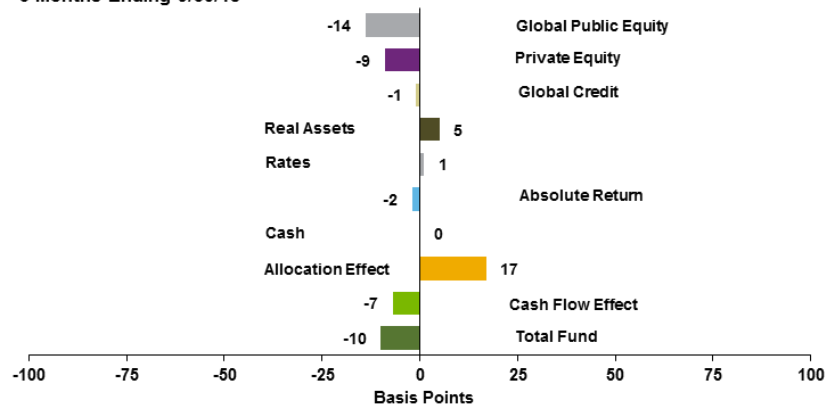
³ Allocation represents the paced allocation during the transition to the new policy allocation.

Total Fund: Performance

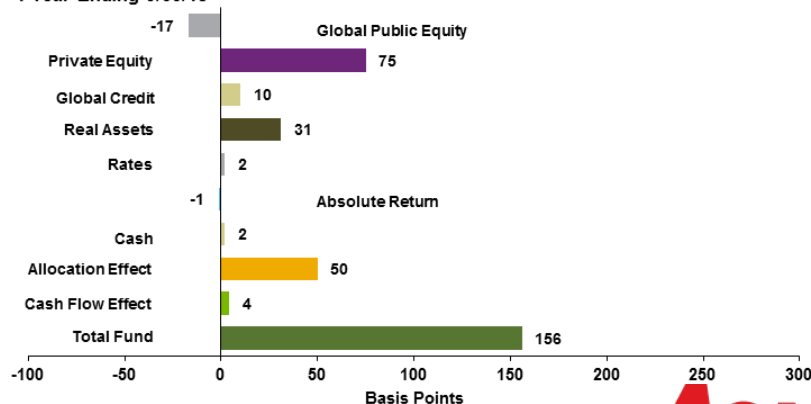
Return Summary



Total Fund Attribution Analysis
3 Months Ending 9/30/18

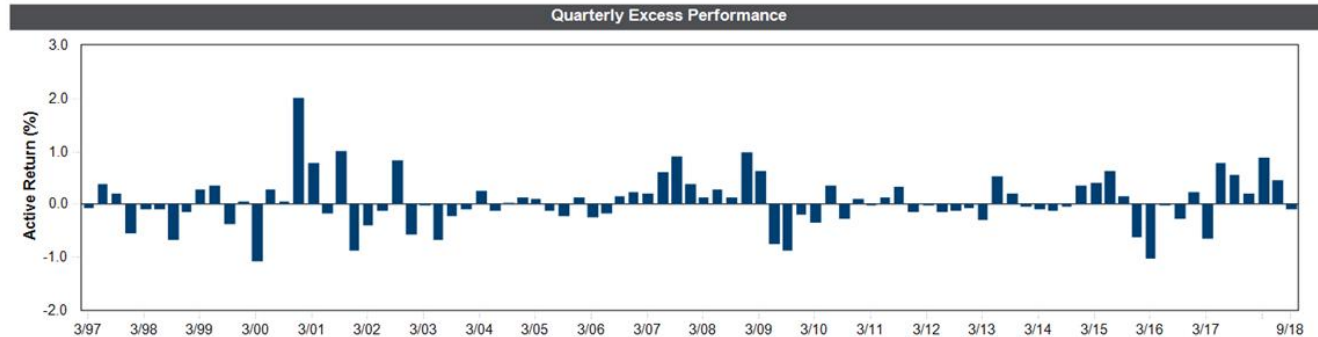
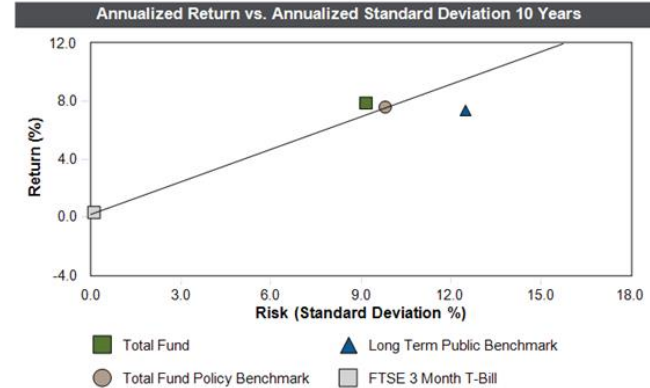
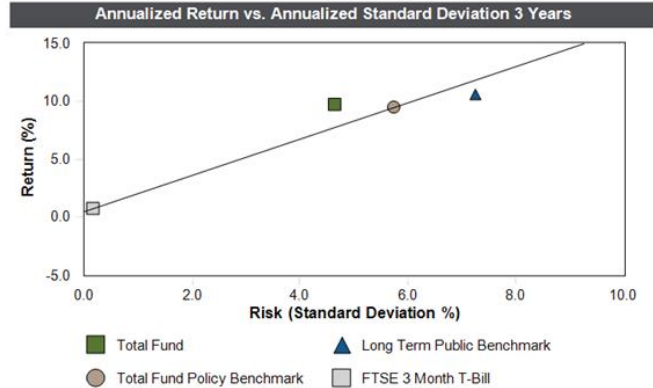


Total Fund Attribution Analysis
1 Year Ending 9/30/18



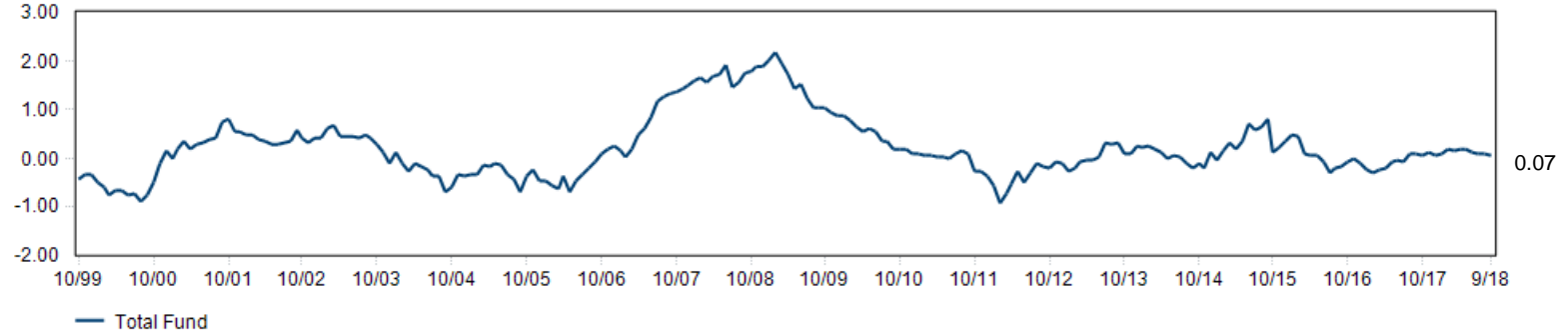
¹The Long Term Public Benchmark is a combination of 79% MSCI ACW IMI and 21% Barclays Intermediate Treasury Index.

Total Fund: Risk

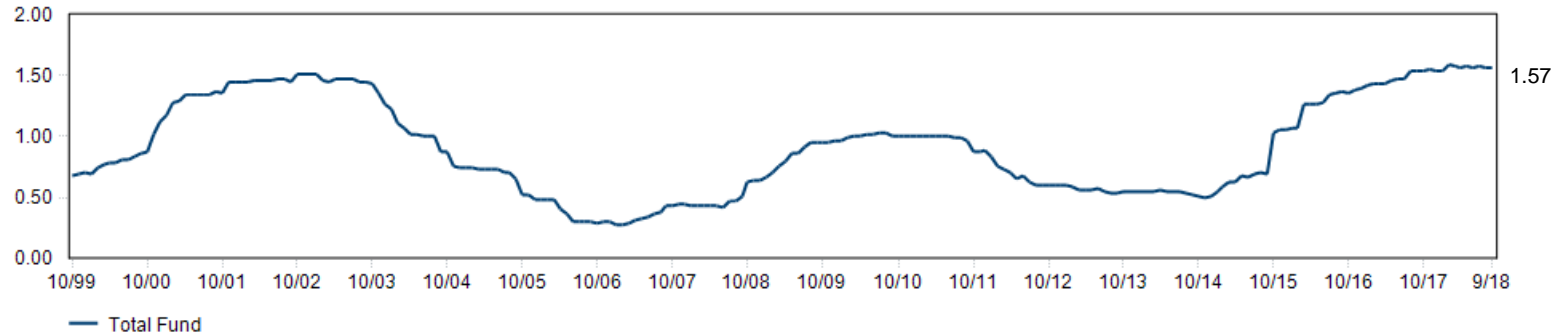


Total Fund: Rolling Information Ratio and Tracking Error (36 months)

Information Ratio (Excess Return Ratio)¹



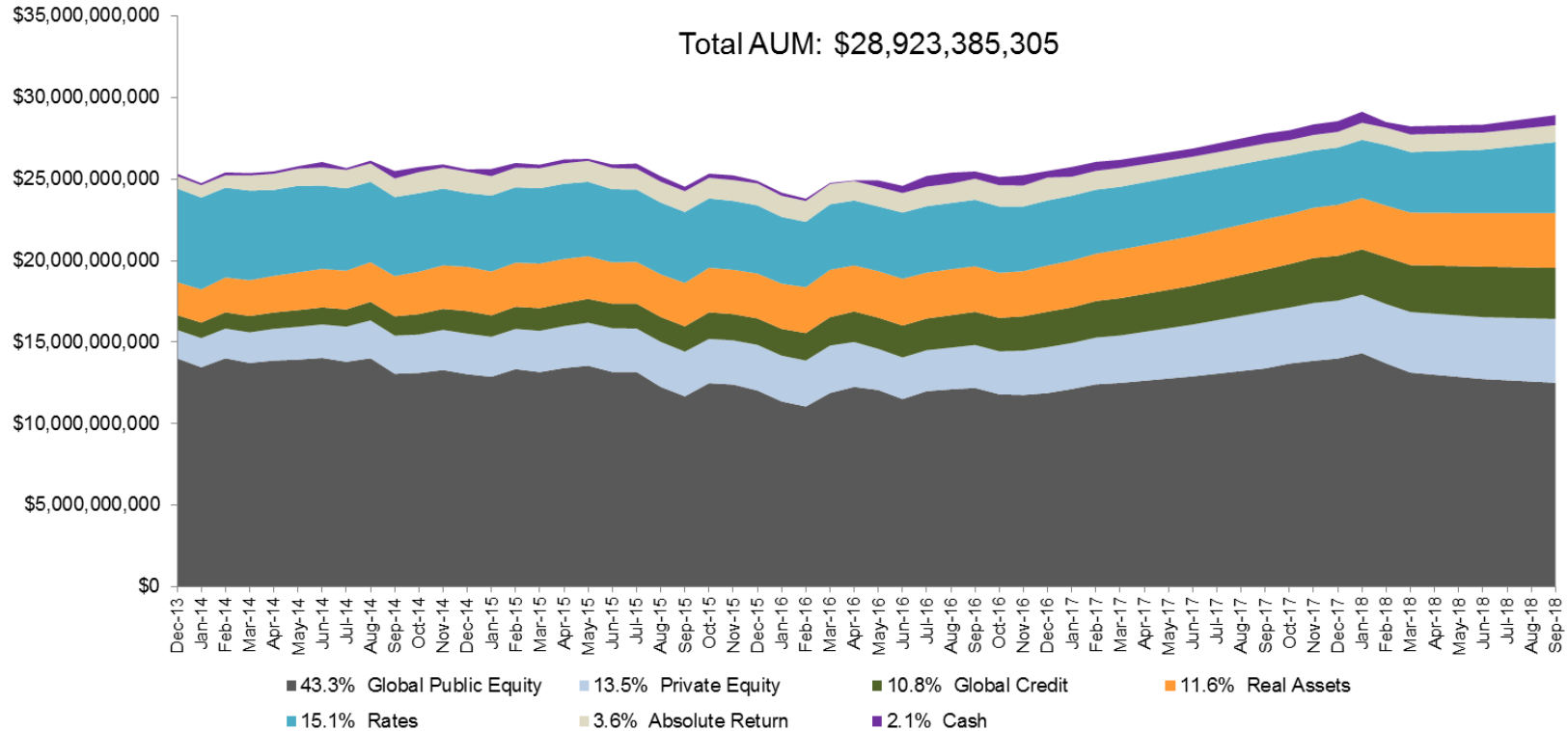
Tracking Error²



¹ Measured by dividing the active rate of return by the tracking error. The higher the Information Ratio, the more value-added contribution by the manager.

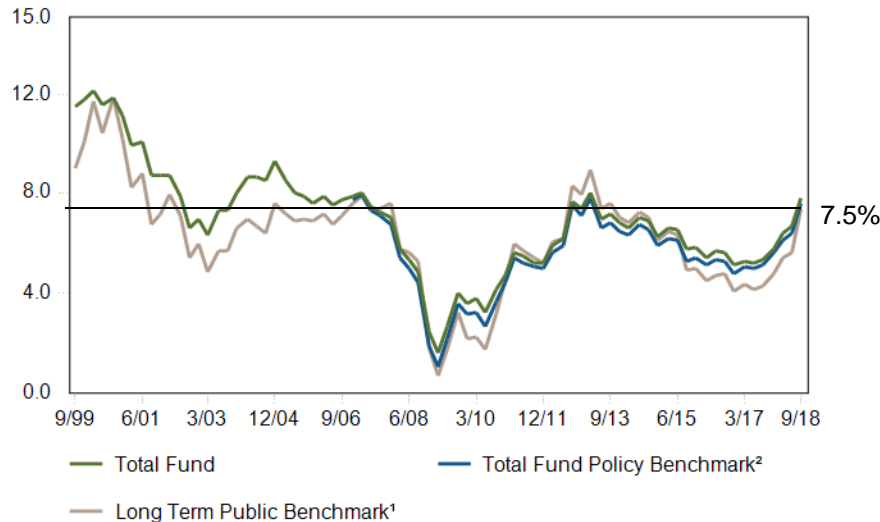
² A measure of the standard deviation of a portfolio's performance relative to the performance of an appropriate market benchmark.

ERS Asset Allocation Evolution

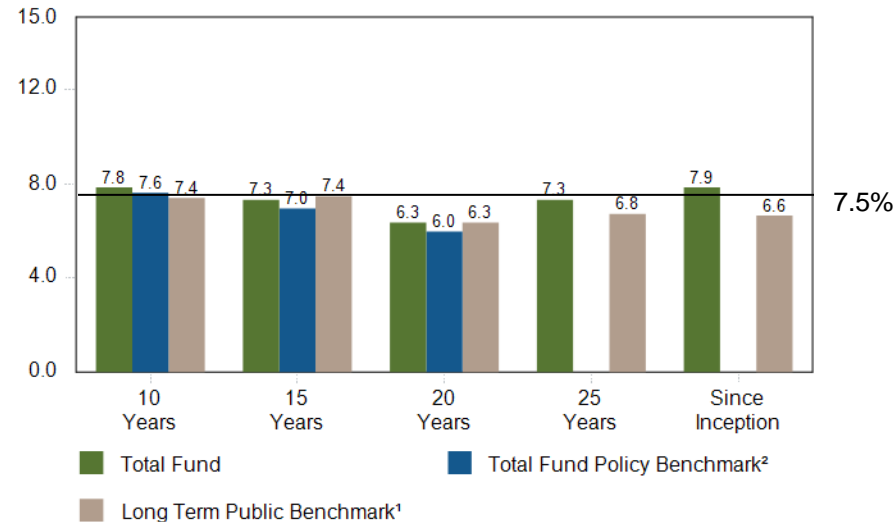


Long Term Investment Results

Rolling 10 Year Return



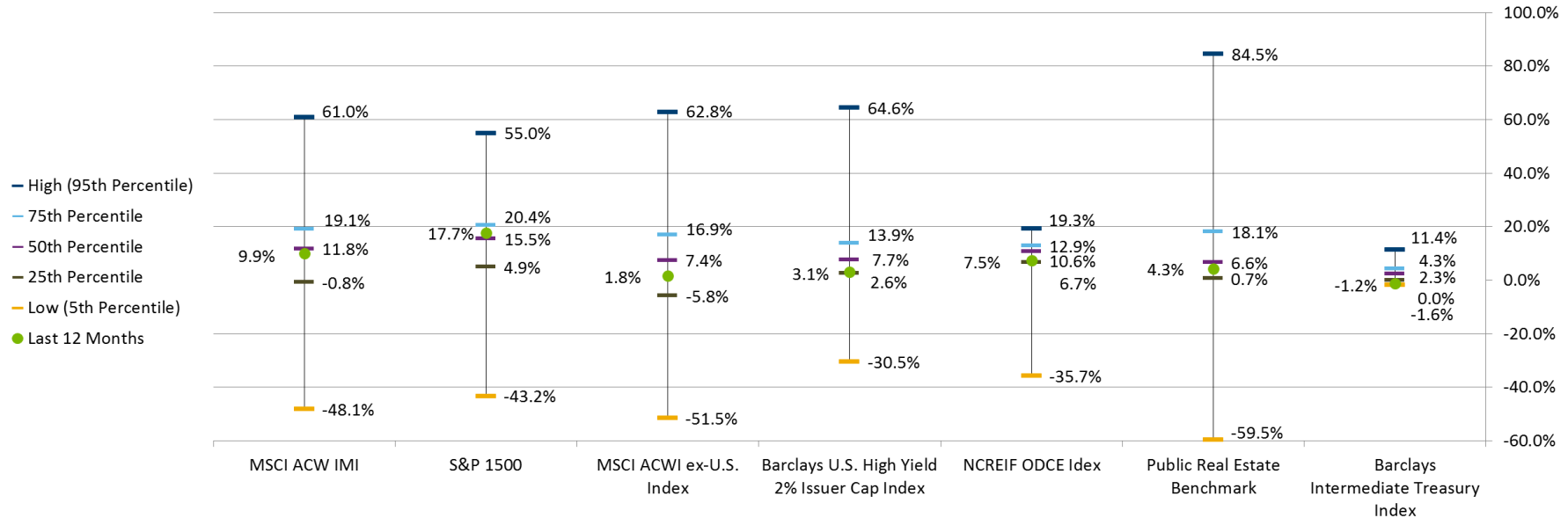
Return Summary



¹The Long Term Public Benchmark is a combination of 79% MSCI ACW IMI and 21% Barclays Intermediate Treasury Index.

²The Total Fund Policy Benchmark has an inception date of 11/30/1996.

Rolling 12-Month Capital Market Returns (10 Years ending 9/30/18)

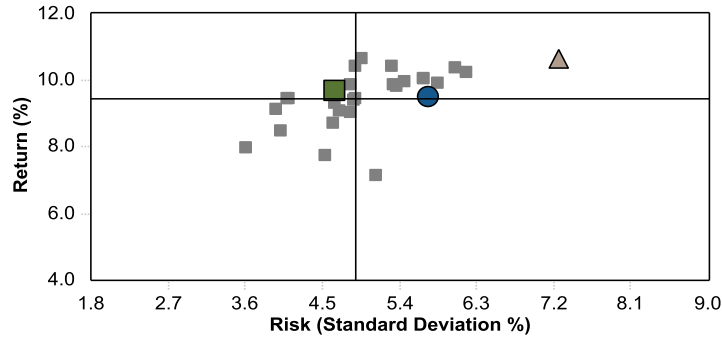


- The chart above depicts the dispersion of rolling 12 month returns of various capital markets over the last 10 years.



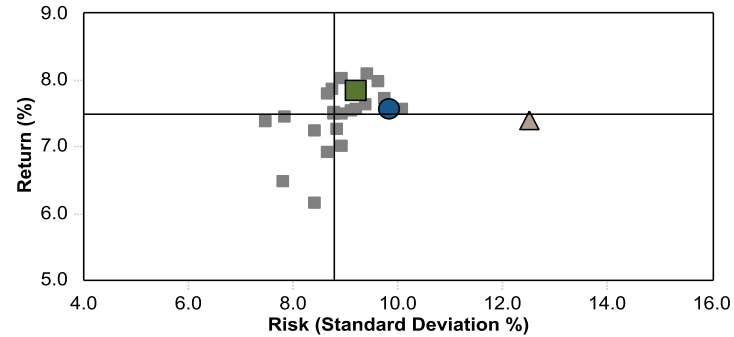
Total Fund: Peer Return/Risk

Annualized Return vs. Annualized Standard Deviation 3 Years



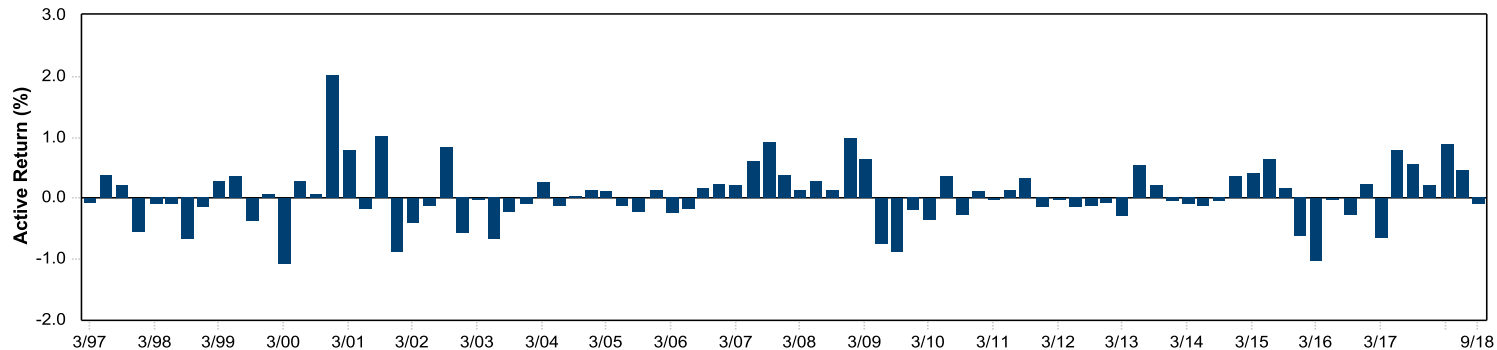
Peergroup
 Total Fund
 Total Fund Policy Benchmark
 Long Term Public Benchmark

Annualized Return vs. Annualized Standard Deviation 10 Years



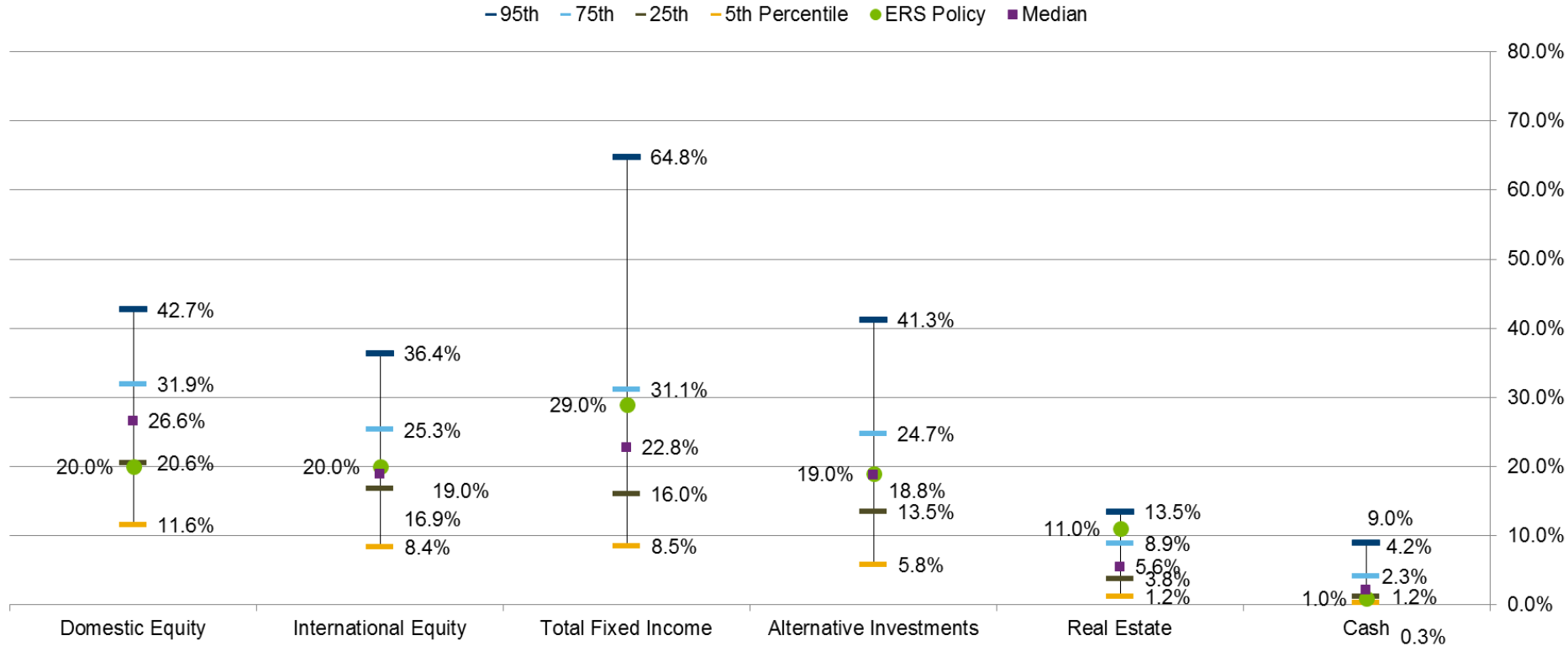
Peergroup
 Total Fund
 Total Fund Policy Benchmark
 Long Term Public Benchmark

Quarterly Excess Performance



¹ Peer group consists of public funds with assets greater than \$10 billion.

Asset Allocation Relative to Peers as of 9/30/2018



¹ Global credit and rates asset classes are included in the fixed income category while private equity, infrastructure and absolute return asset classes are categorized as alternatives

² Peer group consists of public funds with assets greater than \$10 billion.

Summary Analysis

- The Total Fund outperformed its benchmark by 156 bps during the trailing 12 month period.
 - The private equity and real assets components contributed 75 bps and 31 bps, respectively, while the credit component contributed an additional 10 bps to relative performance.
 - The rates and cash components contributed marginally for the year while public equity detracted 17 bps from relative performance.

- At the end of the period global equity was overweight 4.8%, while the total rates component was underweight 2.9% and all other asset classes were slightly overweight or underweight relative to the policy. All allocations were in compliance.

- Longer term investment results continue to be positive, the Total Fund has produced risk adjusted returns superior to the benchmark and the Long Term Public Benchmark over the five and ten year periods.
 - The Total Fund outperformed the benchmark in nominal terms by 38 bps and 26 bps over the trailing five and ten-year periods, respectively.

- Diversification has been effective, the Total Fund Policy Benchmark has produced a return similar to the Long Term Public Benchmark at a meaningfully lower level of risk (volatility) over the trailing five and ten year period.

Questions?



*Public Agenda Item #7.1

Risk Management *Discussion of the Risk Management Program*



December 12, 2018

Carlos Chujoy, CFA, Risk Officer – Risk Management & Applied Research
Stuart Williams, CFA, Portfolio Manager – Risk Management & Applied Research
Steve Voss and Michael McCormick, Aon Hewitt

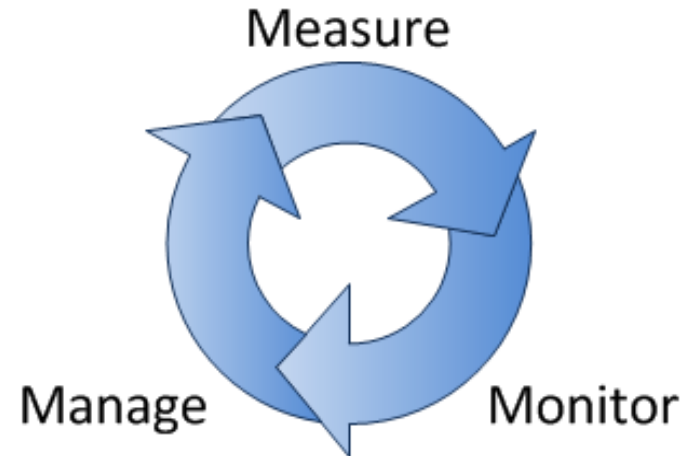
Agenda



- Overview and Background
- ERS Portfolio
- Economic Conditions and Market Cycles
- Market Concerns
- Future Initiatives
- Aon Review
- Q&A

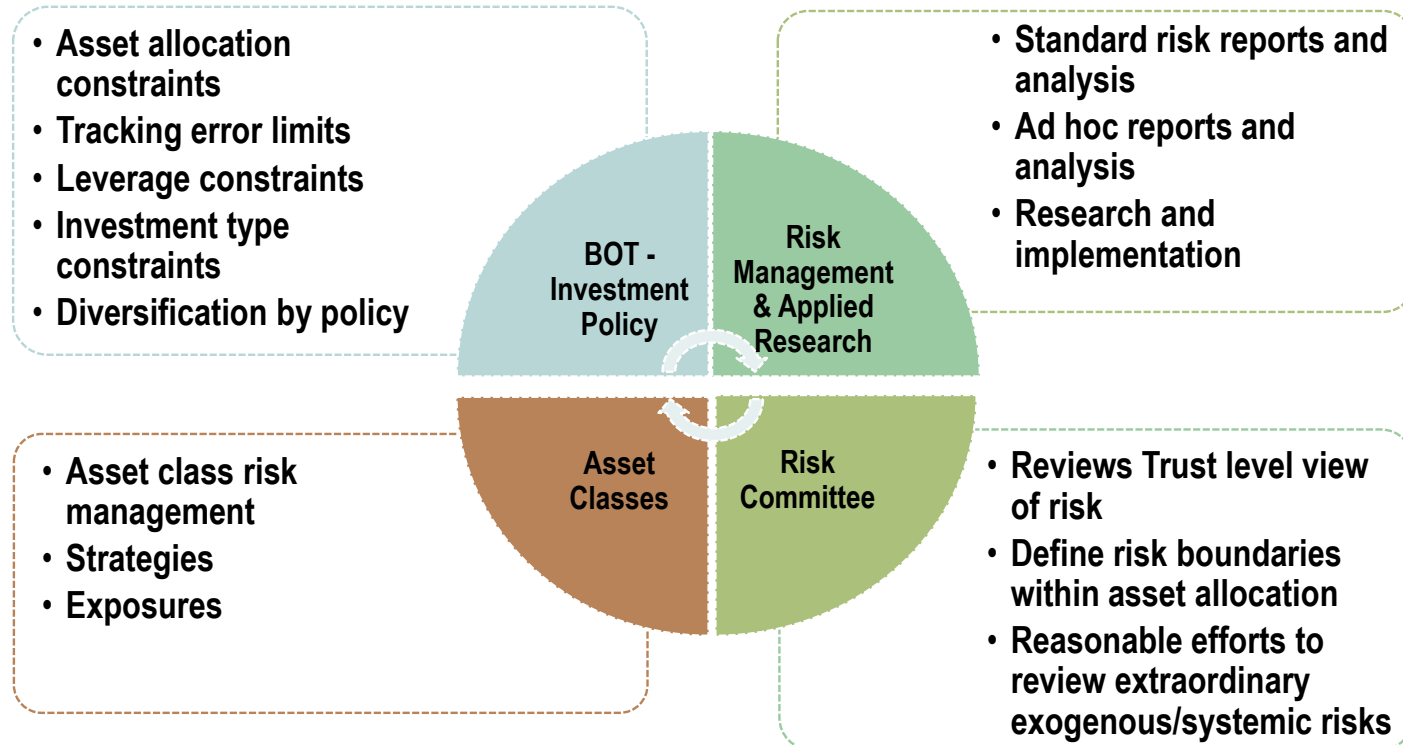
Overview and Background

- Identify and **measure** salient investment risks relevant to the trust
- **Monitor** risks (define risk boundaries and tolerances)
- Respond to and **manage** investment risks



Overview and Background

Risk Management Process



Overview and Background

Team



RMAR Team

- **Carlos Chujoy, CFA**
Risk Officer
- **Stuart Williams, CFA**
Senior Portfolio Manager
- **Joy Seth, CFA**
Investment Analyst
- **Satitpong Chantarajirawong, CFA**
Investment Analyst
- **Yu Tang**
Investment Analyst

Voting Risk Committee Members

- **Tom Tull, CFA**
Chief Investment Officer
- **Sharmila Kassam, CPA**
Deputy Chief Investment Officer
- **Carlos Chujoy, CFA**
Risk Officer
- **Leighton Shantz, CFA**
Director - Fixed Income
- **John Streun, CFA**
Director - Public Equity
- **Anthony Curtiss, CFA**
Director - Hedge Funds

ERS Selected Metrics



Asset Class	AUM <i>(in millions)</i>	Weight	Excess Weight	FYTD Return <i>Ending 8/31/18</i>	FYTD Excess Return <i>Ending 8/31/18</i>	Annualized SD	Annualized Return	Annualized Excess Return	IR	SR	TE	Beta	R^2
Total Fund	\$29,009.8	100.00	NA	9.58	1.63	5.17	8.33	0.41	0.32	1.51	1.30	0.86	96.06
Total Return Seeking Assets	\$22,998.8	79.28	3.33	11.66	4.05	6.79	10.02	0.88	0.48	1.39	1.84	0.85	95.61
Total Risk Reduction	\$6,011.0	20.72	-3.33	0.74	0.15	1.40	2.11	0.30	0.62	1.14	0.49	0.85	90.98

ERS Selected Metrics

Asset Class



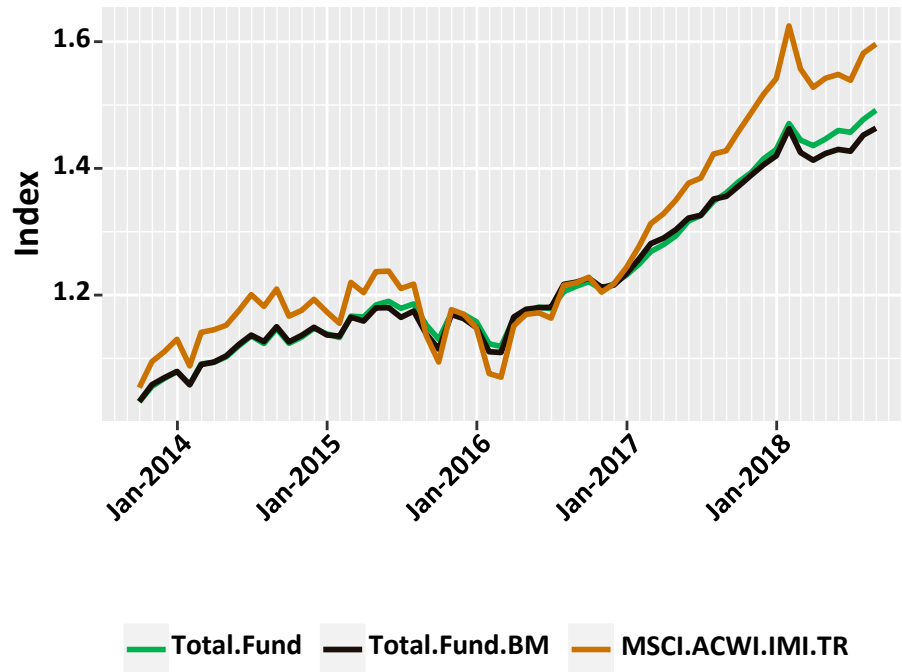
Asset Class	AUM <i>(in millions)</i>	Weight	Excess Weight	Annualized SD	FYTD Return <i>Ending 8/31/18</i>	FYTD Excess Return <i>Ending 8/31/18</i>	Annualized Return	IR	TE	Beta
Global Public Equity	\$12,692.6	43.75	3.75	9.73	12.02	-0.10	9.94	-0.08	1.13	0.97
Global Private Equity	\$3,860.6	13.31	1.31	15.70	16.60	4.81	14.46	0.06	7.73	0.22
Internal Global Credit	\$2,557.5	8.82	NA	4.76	3.19	-0.21	6.11	0.46	1.02	0.94
External Global Credit	\$515.7	1.78	NA	4.93	10.00	7.40	7.91	0.47	4.99	0.49
Public Real Estate	\$819.6	2.83	-0.17	10.11	5.74	-0.46	6.83	-0.77	1.05	0.98
Private Real Estate	\$1,986.5	6.85	-1.15	17.61	11.87	3.43	13.21	1.56	2.65	0.20
Private Infrastructure	\$566.1	1.95	0.00	11.61	9.29	0.00	-2.16	NaN	0.00	1.00
Total Rates	\$4,190.2	14.44	-3.60	2.01	-1.10	0.20	1.38	1.19	0.17	0.96
Total Cash	\$780.6	2.69	1.69	1.17	2.72	1.21	1.75	1.09	1.15	-1.29
Absolute Return	\$1,040.3	3.59	-1.41	2.21	5.88	0.39	5.16	0.31	2.22	8.15

Data: 2013-09-30 to 2018-08-31. We used public proxies to estimate the standard deviation of Global Private Equity, Private Real Estate, and Private Infrastructure.

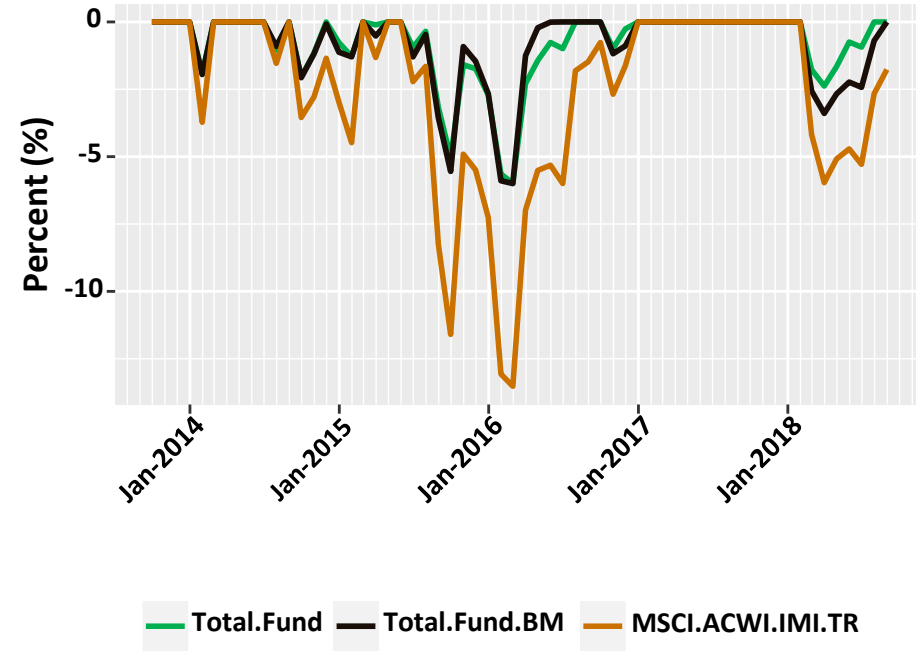
ERS Exposures and Potential Drivers of Risk



Cumulative Returns



Drawdown

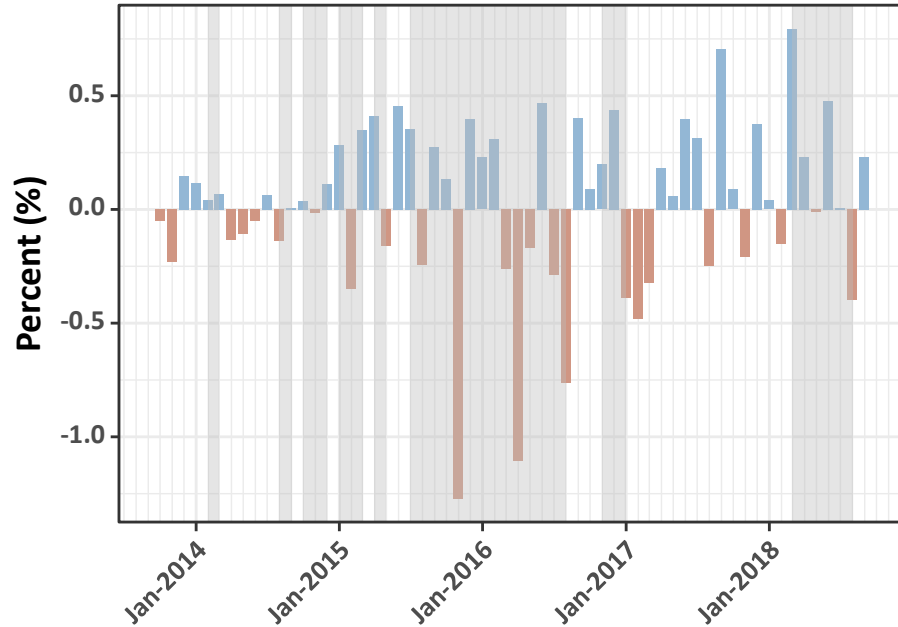


ERS Exposures and Potential Drivers of Risk

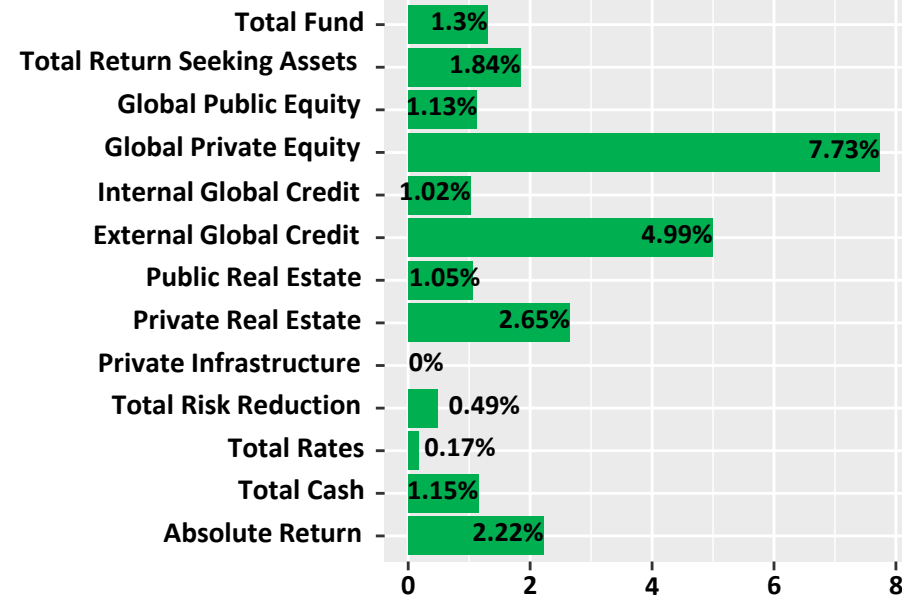
Continued



Excess Returns



Tracking Error ¹



1. Tracking Error calculated using asset class policy benchmark

Asset Class and Risk Monitoring

	Asset Allocation	Active Risk	Tail Risk	Sector	Factor Risk	Currency	Stress Test	Financial Leverage	Derivatives	Counterparty	Liquidity				
Global Equity															
Public Equity	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				
Private Equity	✓			✓		✓		✓		✓	✓				
Fixed Income															
Global Credit	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				
Rates	✓	✓	✓		✓		✓		✓	✓	✓				
Cash	✓					✓				✓	✓				
Real Assets - Private	✓			✓		✓		✓		✓	✓				
Real Assets - REITs	✓	✓	✓	✓	✓	✓	✓		✓		✓				
Absolute Return	✓		✓	✓	✓		✓	✓		✓	✓				
Overall Trust	✓	✓	✓	✓	✓	✓	✓		✓		✓				
<table><tr><td>✓</td><td>risk is currently measured and monitored</td></tr><tr><td></td><td>not currently monitored or available</td></tr></table>												✓	risk is currently measured and monitored		not currently monitored or available
✓	risk is currently measured and monitored														
	not currently monitored or available														

Economic Conditions and Market Cycles

The Classic Business Cycle



EARLY

- Activity rebounds
- Credit grows
- Profits grow fast
- Policy stimulative

MID

- Growth peaking
- Credit grows fast
- Profit growth peaks
- Policy neutral

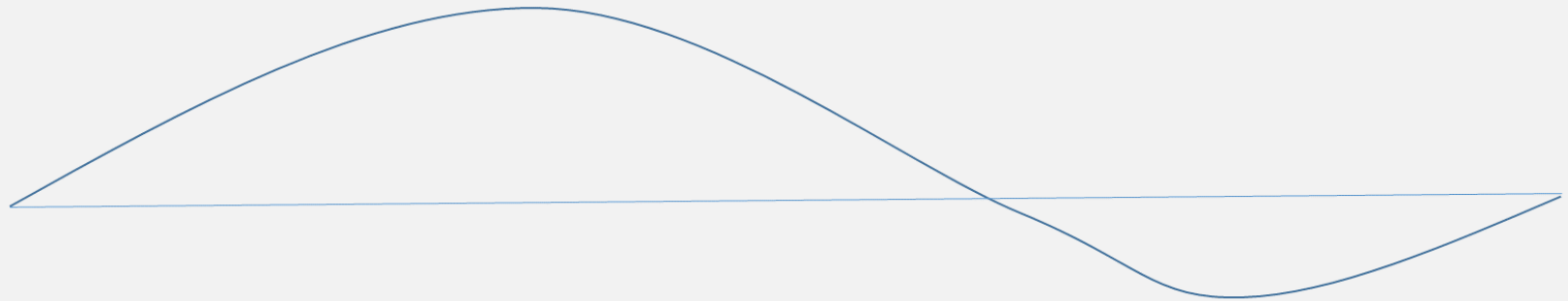
LATE

- Growth slows
- Credit tightens
- Earnings pressured
- Policy contractionary

RECESSION

- Falling activity
- Credit dries up
- Profits decline
- Policy eases

Growth



Economic Conditions and Market Cycles



Where are We in the Cycle? – United States

EARLY

- Activity rebounds
- Credit grows
- Profits grow fast
- Fiscal policy stimulative

MID

- Growth peaking
- Credit grows fast—Com'l & Ind'l only
- Profit growth peaks
- Monetary policy neutral

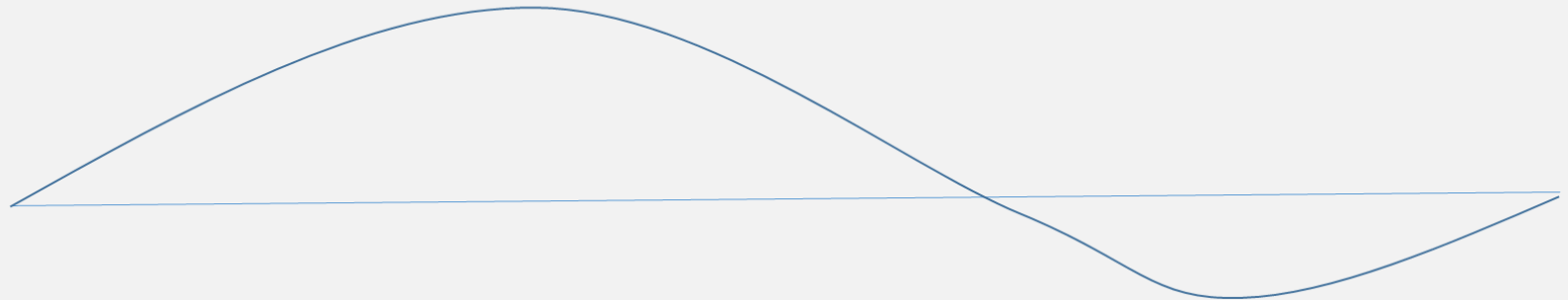
LATE

- Growth slows
- Credit tightens
- Earnings pressured
- Policy contractionary

RECESSION

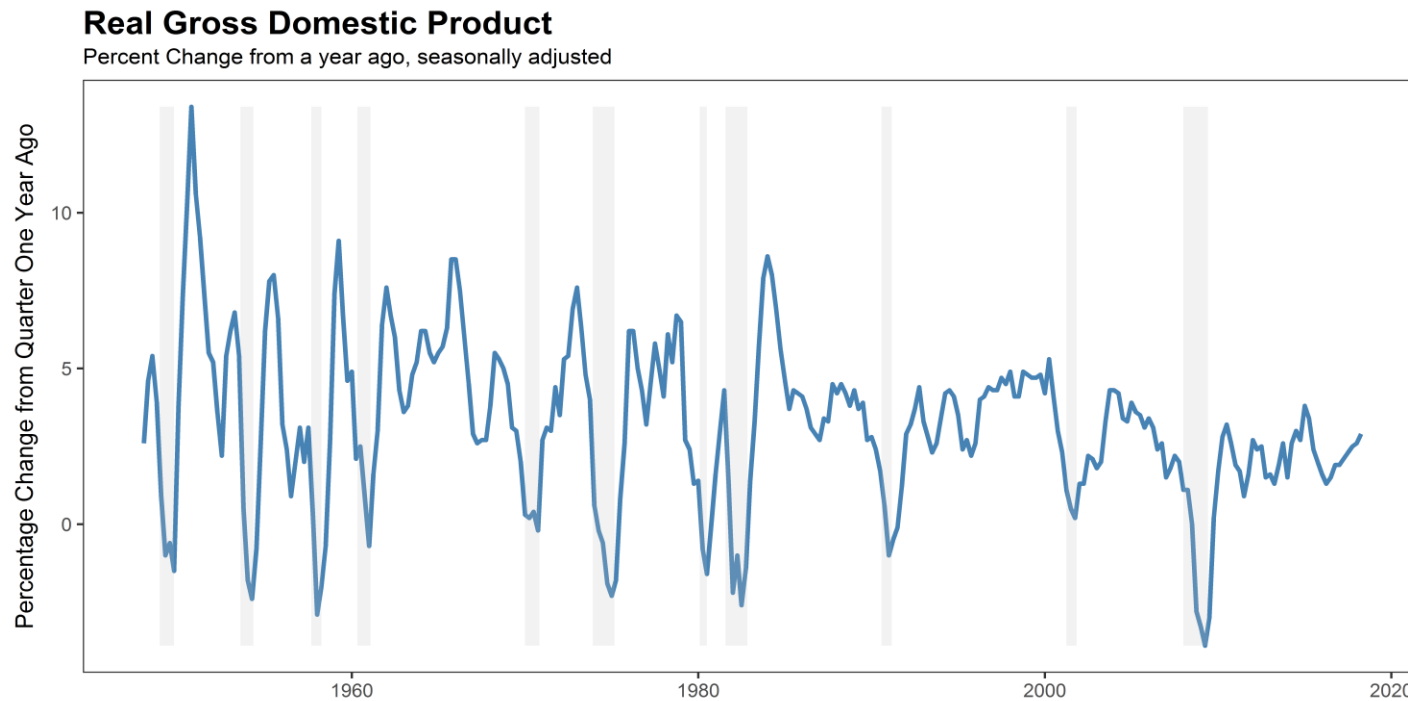
- Falling activity
- Credit dries up
- Profits decline
- Policy eases

Growth



Economic Conditions and Market Cycles

United States



Source: Federal Reserve Bank of St. Louis, ERS

Agenda item 7.1 - Meeting book dated December 12, 2018

Economic Conditions and Market Cycles

A Better Paradigm: The Economy Fluctuates



- Underlying trend is growth
- Growth rate bounces around a lot, usually in the range of -2% to +6%
- Many factors affect the growth rate, such as government policies, inflation, credit, confidence, trade, and currency
- You cannot predict some of those factors—e.g. Lehman—but you can often point to economic imbalances, unsustainable booms, excessive leverage, or unwise policies that render the economy vulnerable

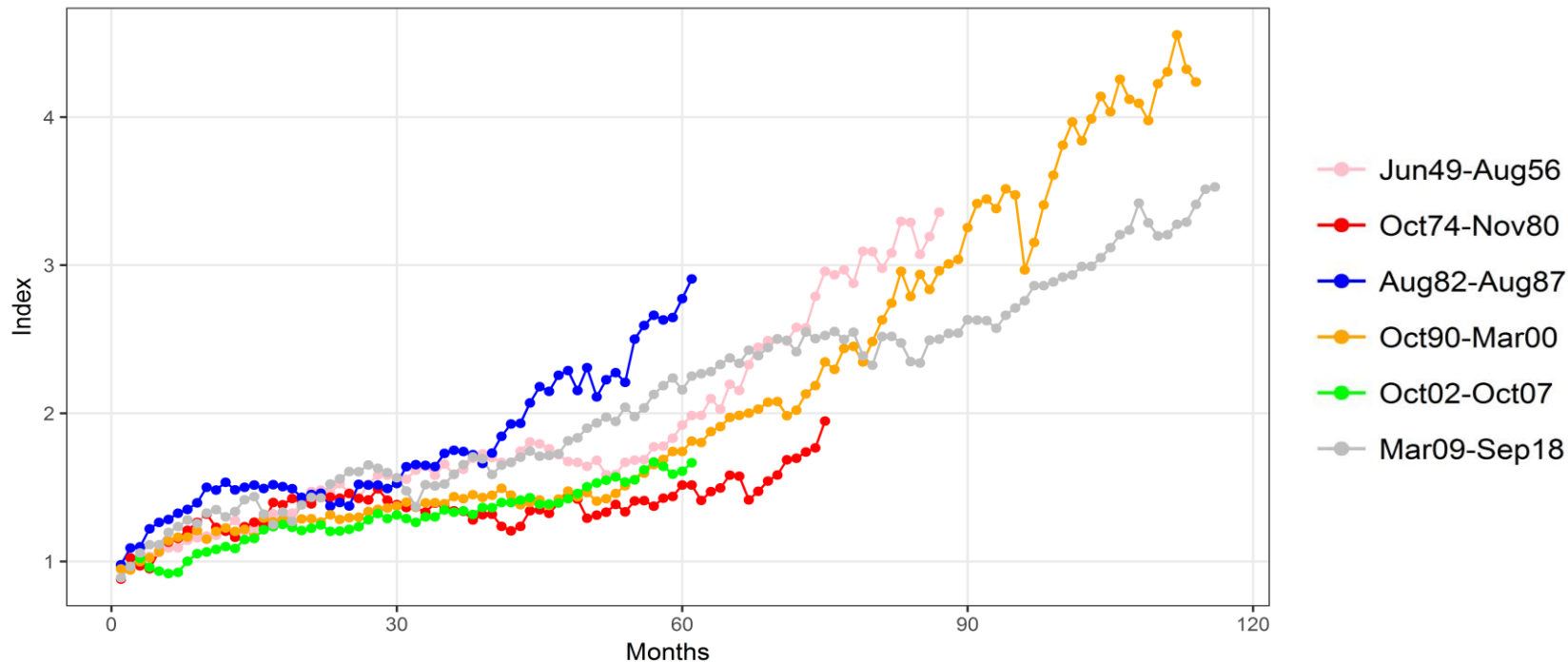
Market Longevity

United States



Longest Bull Market Ever

Since WWII



Source: Bloomberg, ERS

Market Risks

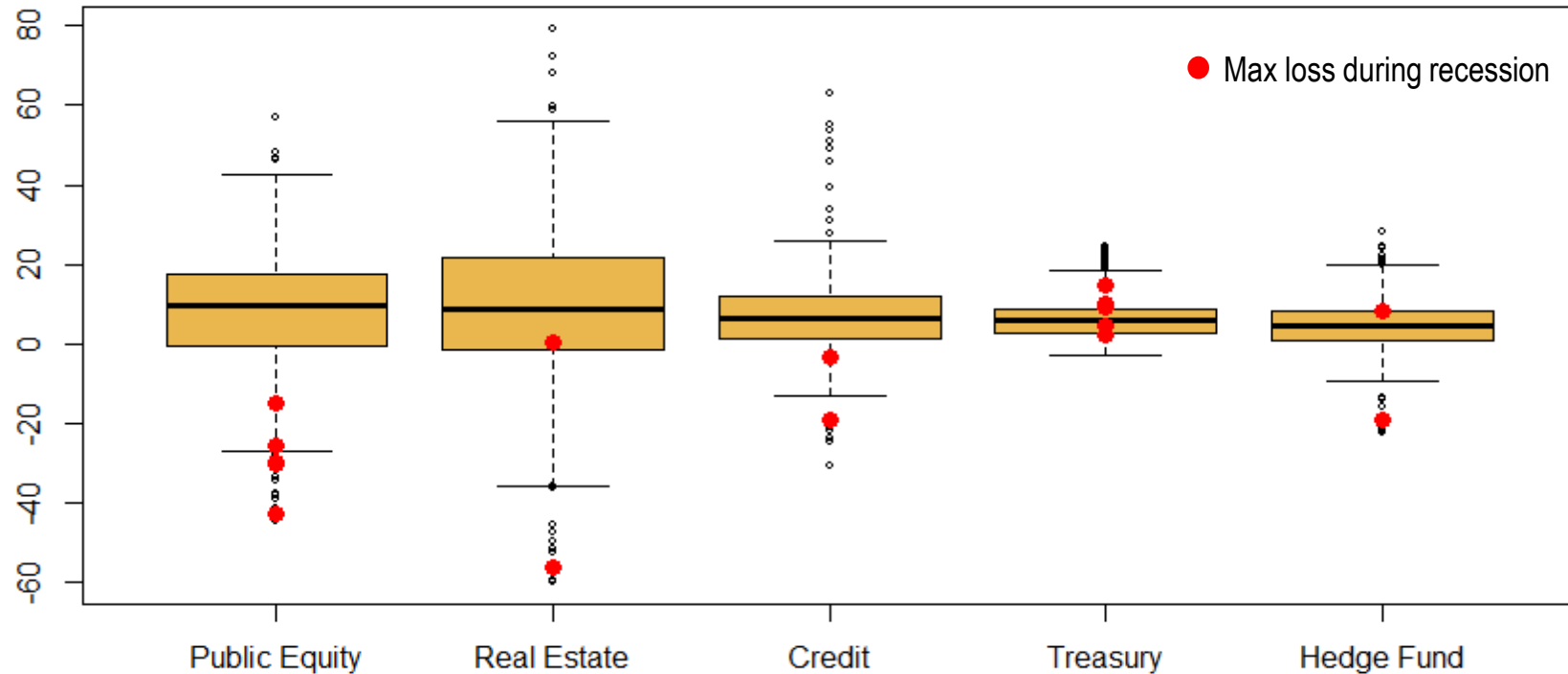


Where are the Vulnerabilities?

- Potential for wage gains and trade conflict to affect profits
- Tighter financial conditions: Yield curve flattening, Fed tightening, Balance Sheet shrinking
- Threat to Euro and financial system, from divergent economies and populist governments
- Potential for equity valuations to revert to normal levels
- Potential for high inflows into private market assets to depress future returns
- Decent chance of recession in next two years
 - Would temporarily depress asset valuations and trust funding level

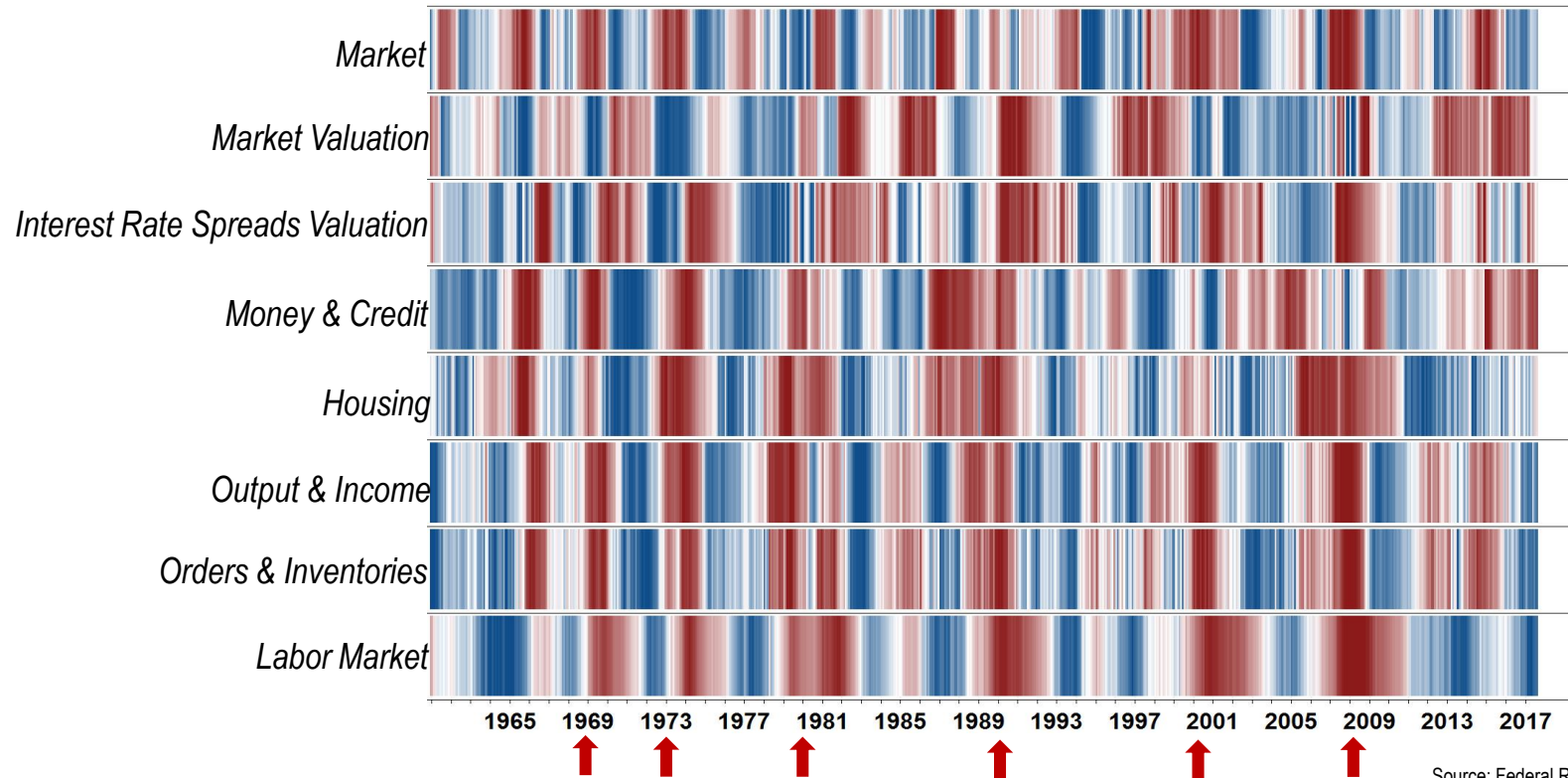
Public Asset Class Performance During Crisis

Range of outcomes during past 5 recessions



Economy and Market Conditions

Macro Economic Indicators



Agenda item 7.1 - Meeting book dated December 12, 2018

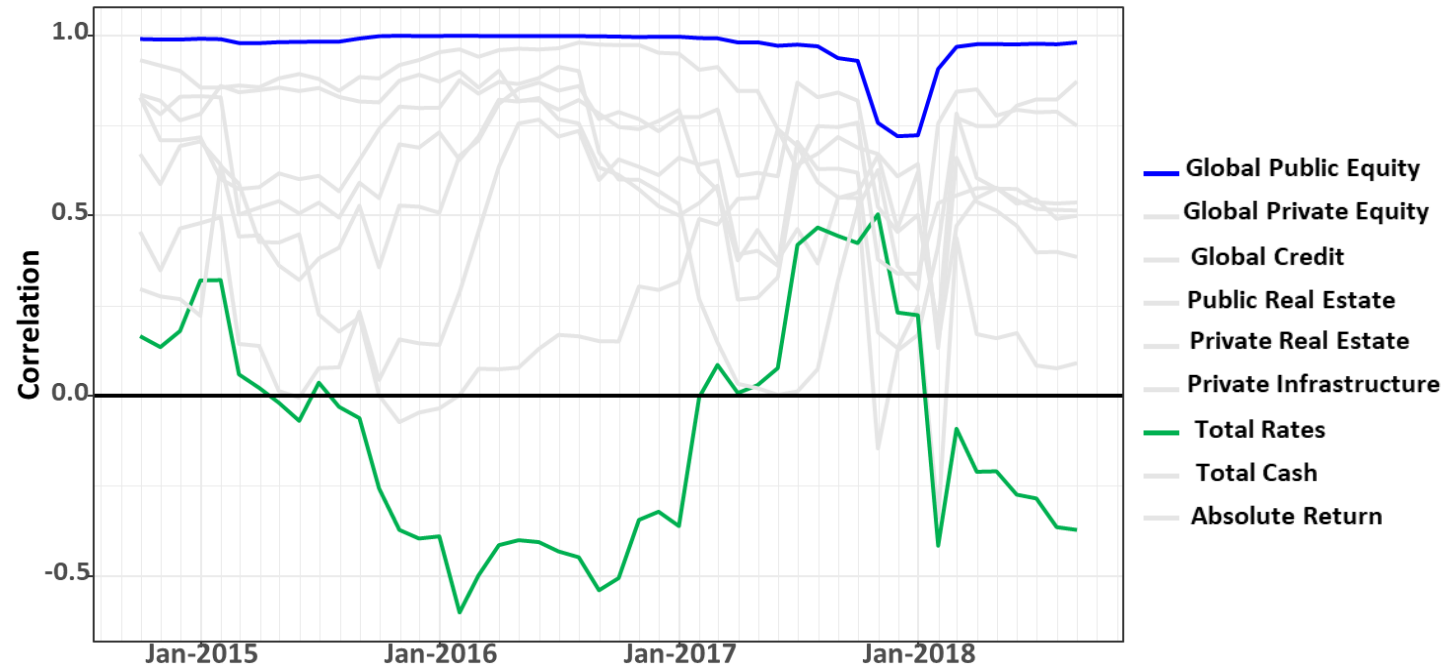
Source: Federal Reserve Bank of St. Louis, NBER, ERS. Data covers the period of Dec. 1960-Jul. 2018

Correlations: A Historical Perspective



- Equity is the highest correlated asset to Total Plan Asset Returns
- Rates portfolio best natural hedge against market downturns

Correlation against Total Plan Return

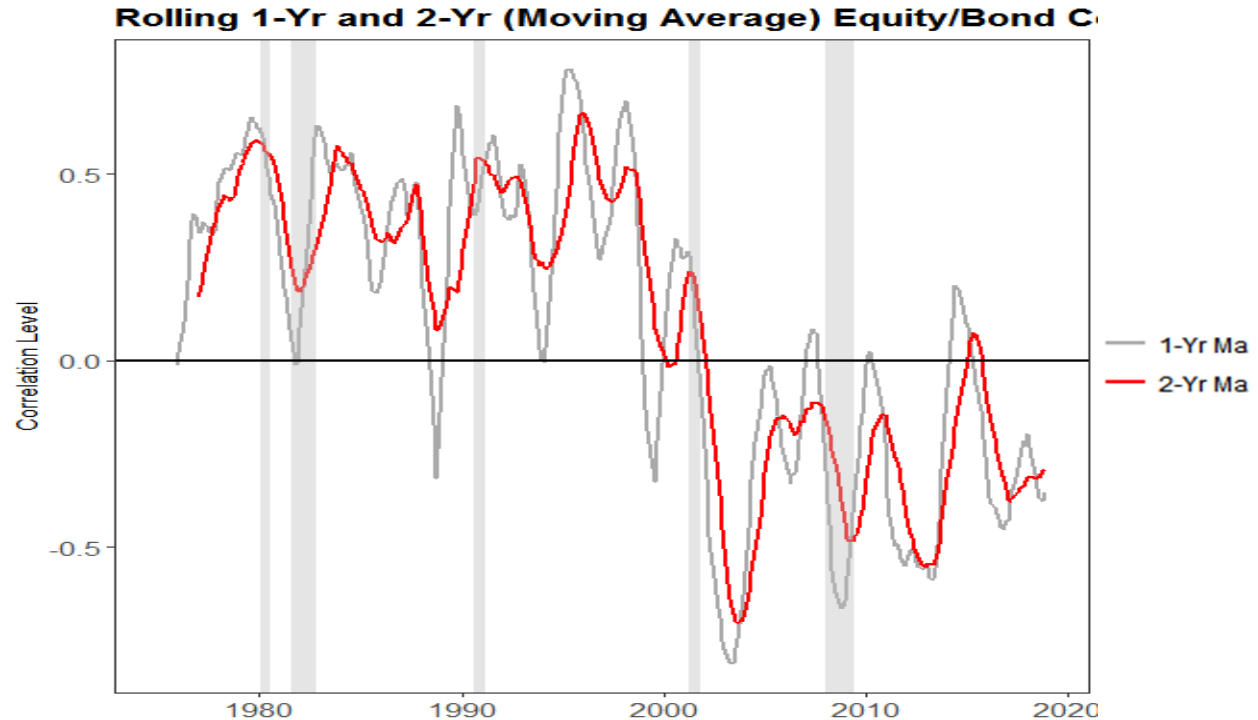


Correlations: A Historical Perspective

Equity/Bond Correlation – Long-Term Perspective



- Low correlations levels have been the cornerstone of portfolio construction
- Increasing levels reduce the benefits of diversification



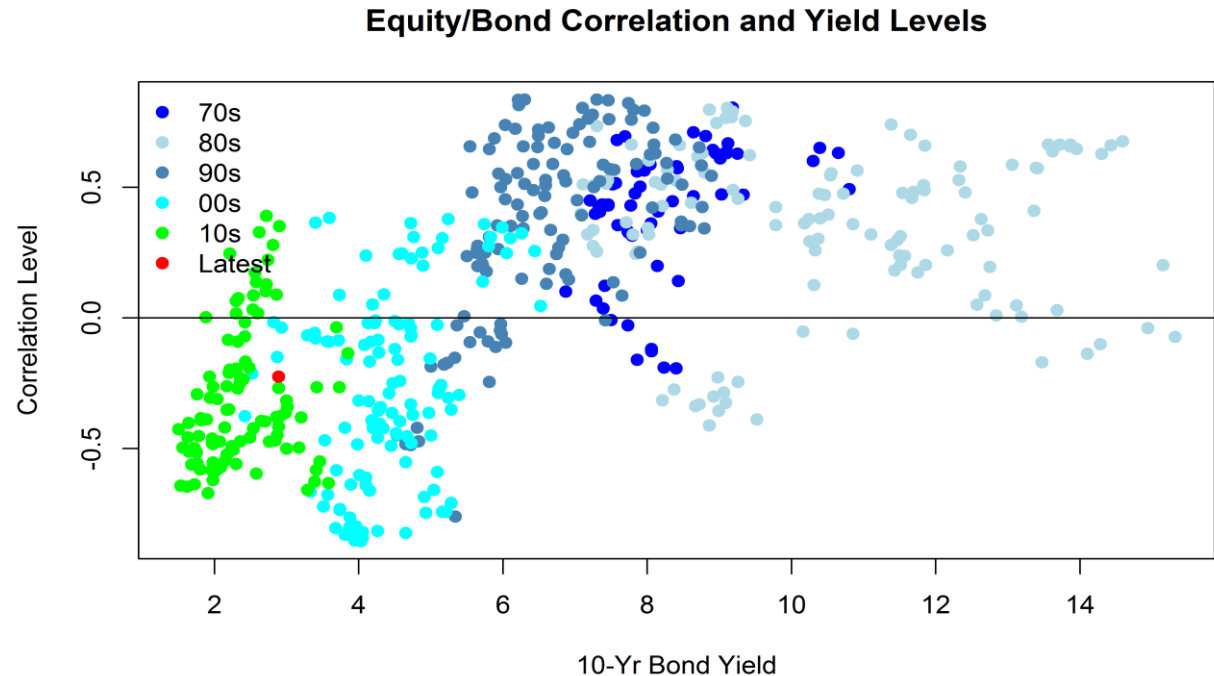
Source: Federal Reserve Bank of St. Louis, ERS
Data covers the Period of Dec.1974-Sep.2018

Correlations: A Historical Perspective

Equity/Bond Correlation



- Correlations have historically been
 - Generally negative when yields < 4%
 - Generally positive when yields > 7%
- Yields are rising and the benefits of diversification between these two assets may stand a high chance of decreasing.



Future Initiatives

Fiscal Year Initiatives



- Assist in the development of a robust Investment Policy Statement with regards to risk
- Refine current set of risk dashboards
- Assist with the identification of downside protection strategies to offset negative market events

Comments and Observations

Conclusion



- ERS portfolio has done well over the past year
- The business cycle is at a good starting point to understand the markets
- RMAR dashboards assist with monitoring market activity
- RMAR expects market volatility to increase
- Correlation analysis suggests Bonds to be the best diversifier to risky assets among all assets in the plan
- Equity/Bond correlations are on the low end despite rising yields. Portfolio diversification benefits may reduce going forward



Risk Discussion

Employees Retirement System of Texas

December 2018

Aon Hewitt
Retirement and Investment

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Investment advice and consulting services provided by Aon Hewitt Investment Consulting, Inc., an Aon Company.

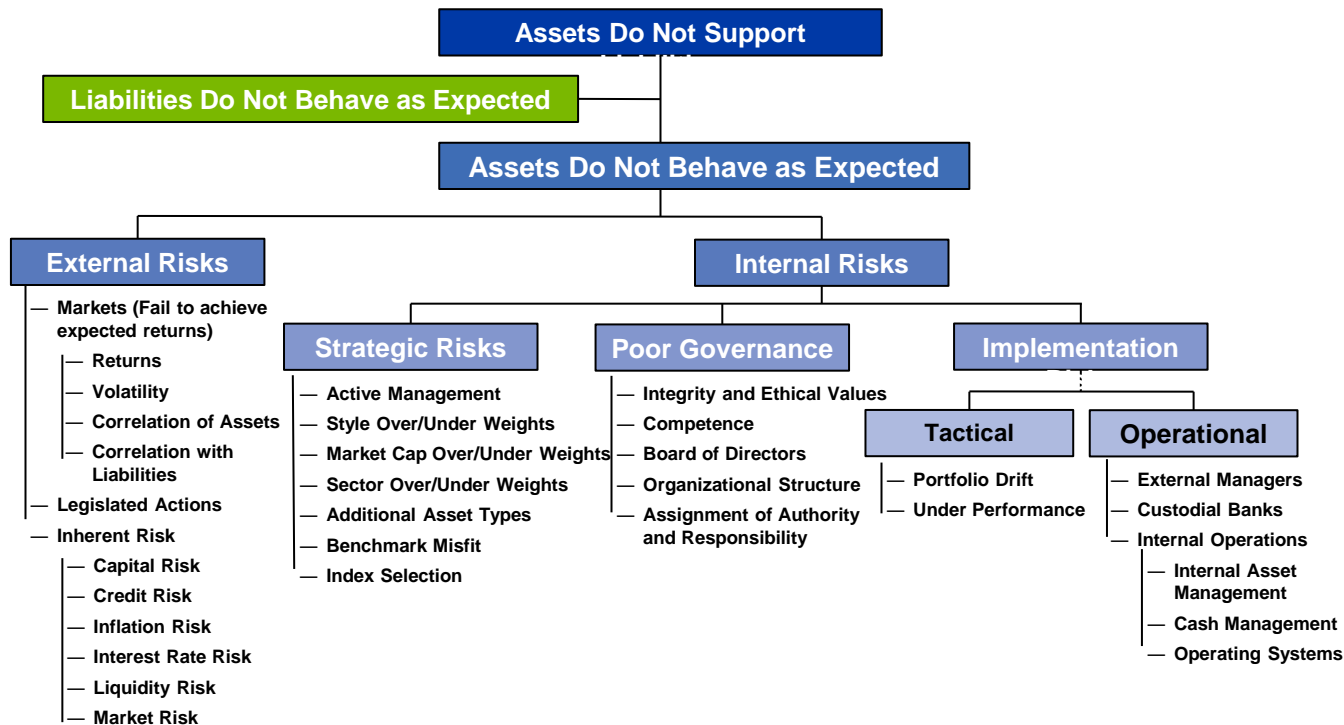
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Risk Management

Spectrum of Investment Risks



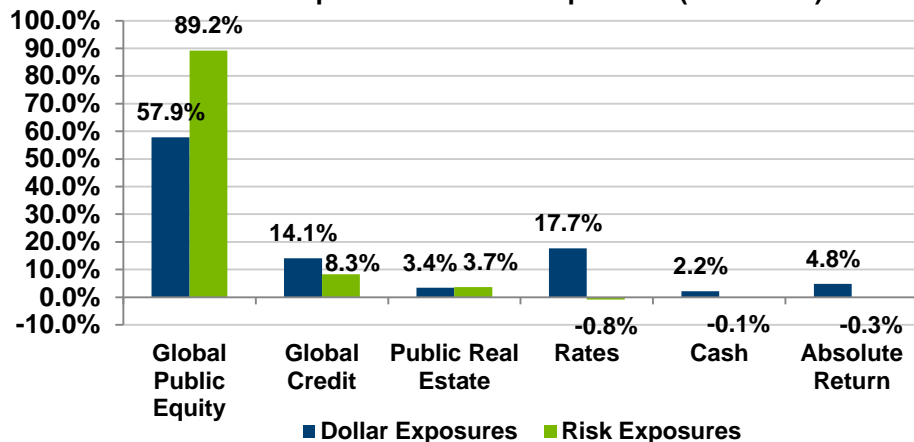
Source: Public Pension Systems: Statements of Key Investment Risks and Common Practices to Address Those Risks (Endorsed by APPFA, NASRA, NCTR, and GFOA)

ERST Risk Exposures Dashboard – Public Assets

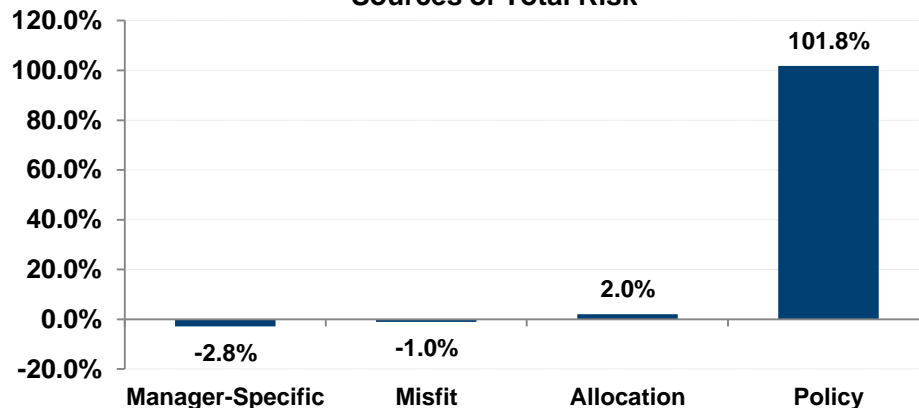
Illustrative

Nominal Risk = 6.33%

Dollar Exposures vs. Risk Exposures (Total Risk)



Sources of Total Risk



Key Observations

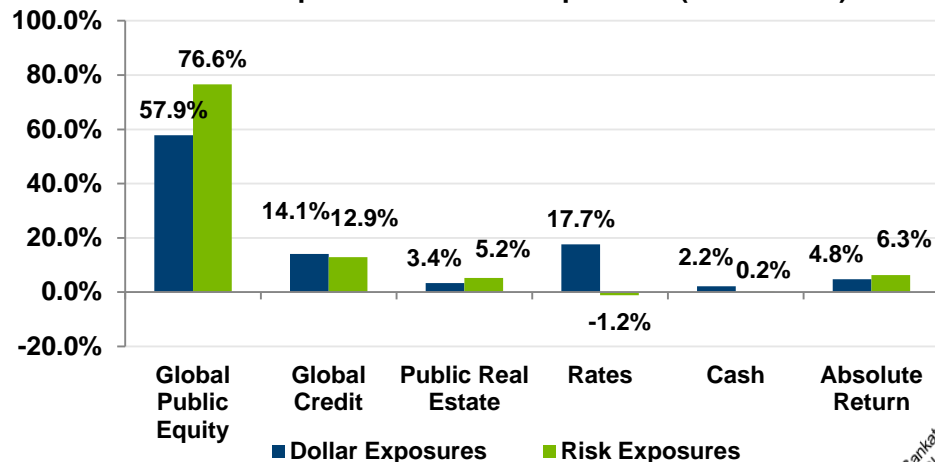
- Policy (beta) risk dominates results; this tends to be true in most long-term oriented investment programs
 - Public equity asset class accounts for ~ 90% of total fund risk

ERST Risk Exposures Dashboard – Public Assets

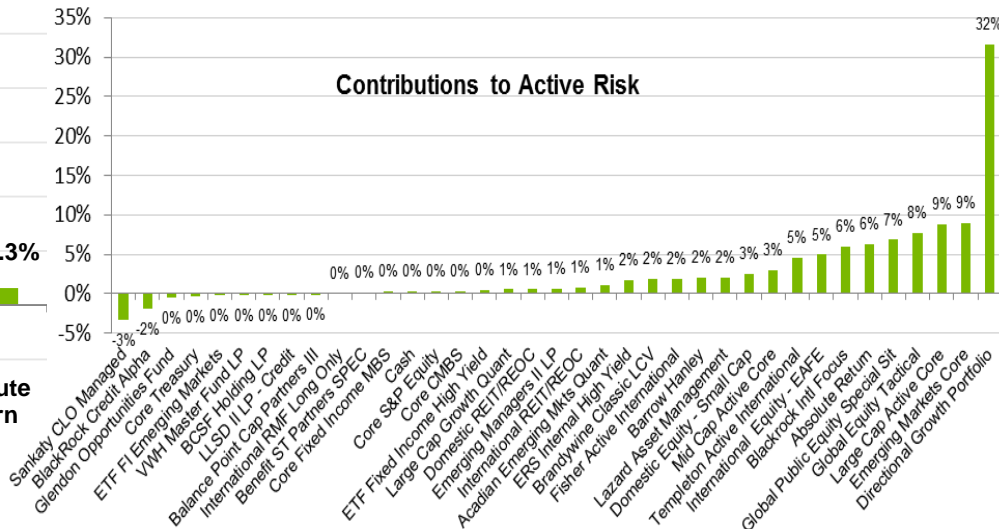
Illustrative

Active Risk = 0.75%

Dollar Exposures vs. Risk Exposures (Active Risk)



Contributions to Active Risk



Key Observations

- Total implementation (active) risk of 0.75% is slightly lower than median AHIC client
 - Roughly 50% of manager-specific risk comes from the Directional Growth, Emerging Markets Core, and Large Cap Active Core portfolios

Questions?



*Public Agenda Item #8.1

Review of ERS' Investment Policy Draft



December 12, 2018

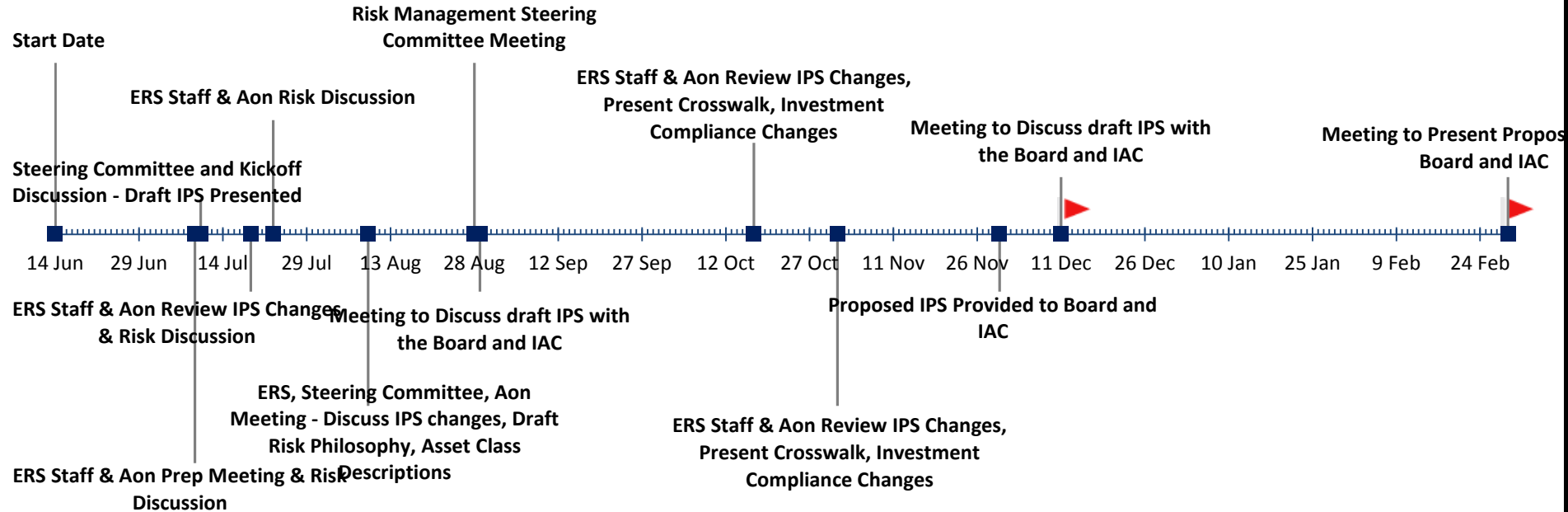
Tom Tull, CFA, Chief Investment Officer
Sharmila Kassam, CPA, Deputy Chief Investment Officer
Steve Voss and Michael McCormick, Aon Hewitt

Executive Summary



- **The proposed IPS document includes substantial feedback provided by the Board and IAC**
- **The proposed IPS reflects the stated goals and findings of the IPS survey**
- **Material enhancements included in the IPS and reviewed in this presentation include;**
 - Inclusion of ERS investment beliefs
 - Clear communication of delegation related to policy and implementation
 - Succinct asset class descriptions; asset class guidelines within tactical plans
 - Establishment of risk philosophy and refinement of risk management section

ERS' Investment Policy Statement Development Timeline



- The proposed IPS is the result of significant communication, discussion, and review that took place over a six month period
- Continued enhancements will be made to the document as part of the annual IPS review

IPS Survey Comments and Findings



- The common themes below from the IPS survey are consistent with the changes that have been made to the IPS document

Common Theme	Board	IAC	Staff
1 Reduce redundancies within the IPS	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
2 Move to a more principles based policy	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
3 Asset class guidelines should be removed	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
4 The main policy should speak broadly about risk and risk management, and the guidelines should provide detail	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
5 Create a duty of care and delegation of authority table outlining the roles and responsibilities of the Board, IAC, staff, and consultants	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
6 Document that the Board and IAC will review the IPS annually	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
7 Creation of a Mission Statement	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
8 Creation of an Executive Summary	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

ERS Investment Philosophy (page 3)



- The investment philosophy section outlines the high level investment beliefs that will drive investment decisions and serve as a lens for which investment issues are viewed
- **Investment Beliefs:**
 - The most important decision the Board makes is the long-term asset allocation decision.
 - Staff is tasked with implementation through sound strategic decisions.
 - The Board seeks to achieve the objectives of the investment program by supporting a culture that builds upon the input, skills and talents of Staff.
 - Portfolio construction should focus first on the allocation and balancing of risk;
 - it is the allocation of risk that drives portfolio returns.
 - Portfolio diversification is critical because the future is uncertain.
 - Costs matter and need to be effectively managed.
- The investment philosophy section of the document provides further detail on the broad ideas above

Delegation of Authority (pages 9)

TABLE 1 – POLICY LEVEL INVESTMENT RESPONSIBILITIES

- The IPS clearly articulates delegation of authority for strategic decisions and implementation decisions

Investment Responsibility	Board of Trustees	IAC	Executive Director	CIO/Investment Staff	Consultant / Actuary (as applicable)
Investment policy statement	A*	R*	R*	R*	R*
Asset allocation and establish risk tolerance*	A	R	R	R	R
Permissible asset classes	A	R	R	R	R
Performance benchmarks	A	R	R	R	R
Decisions about deviations from policies	A	R	A**	R	R
Selection of general consultant*	A	R	R	R	N/A
Selection of asset class consultants	A	R	R	R	N/A
Selection of custodian bank*	A	R	R	R	R
Selection of securities lending agent*	A	R	R	R	R
Selection of actuarial discount rate	A	R	R	R	R
Proxy voting policy	A	R	R	R	R
Selection of proxy agent	--	--	A	R	N/A
Selection of IAC member	A	N/A	N/A	N/A	N/A

A = Approval Authority, R = Provides Recommendation,

Asset Class Descriptions (pages 15 – 17)

- The asset class descriptions succinctly reviews each policy level asset class highlighting;
 - The policy level benchmark – including the Bloomberg ticker for the index
 - The role of the asset class in the portfolio and reason for inclusion
 - The primary metrics utilized for risk monitoring and management
 - A broad description of the asset class benchmark
 - Active vs passive management implementation
 - Additional Information* - additional relevant information for the given asset class
 - Performance Metric* (Expected Information Ratio)

TABLE 4 – ASSET CLASSES, LEVERAGE, RISK, AND RISK BUDGET
Return Seeking Asset Classes:

Public Equity	
Benchmark -	MSCI ACWI IMI (M1WDW\$GI)
Role -	Growth, Alpha
Primary Risk Control -	150 bps Tracking Error Target / 300 bps Tracking Error Limit
Benchmark Description -	A capitalization-weighted index of large, mid and small cap stocks representing 23 developed and 24 emerging market countries. The index is the broadest measure of the aggregate global stock market, covering approximately 99% of the global equity investment opportunity set.
Management Style -	Active and Passive
Expected Information Ratio	0.25

*Included for each asset classes as applicable

Asset Class Guidelines

(within respective Asset Class Tactical Plans)



- **The asset class guidelines are incorporated into private asset class tactical plans approved by the Board and IAC.**
 - Review of these will happen at least annually during their program reviews at the Joint Meeting of the Board and IAC.
- **Public asset classes will have separate asset class guidelines approved during their annual program reviews at the Joint Meeting of the Board and IAC.**
- **Asset class guidelines will have soft ranges as well as hard ranges for different risk parameters.**
 - Internal review has happened with Investment Compliance for differences among the asset class guidelines related to differences inherent in the asset classes and/or portfolio construction by the staff of the asset class.
 - Investment compliance will monitor compliance with the asset class guidelines.
 - Future discussions at the asset class program reviews will highlight differences between asset class guidelines.

Risk Philosophy (page 18)



- The risk philosophy section overviews how ERS thinks about risk:
 - The ERS investment program is structured to address systematic (or market risk) and non-systematic risk (risks associated with an asset class or portfolio)
 - Risk management has a recognition that some risks are quantitative or statistically measurable while others are not
 - Risk reporting should be timely, relevant and understandable
- The risk philosophy section of the document provides further detail on the broad ideas above

Conclusion



- The proposed IPS is the result of significant work and communication to reflect the views of the Board, IAC, and Staff
 - The changes align with the IPS Survey responses
- We believe the proposed document is more consistent with best practice and will be more easily used by stakeholders
- The IPS is, and should be, a living document
- Proposed IPS draft is submitted to the Board and IAC for review and input

Questions?



Public Agenda Item #9.1

Investments General Consulting Services Contract Award and Recommendation – (Action)



December 12, 2018

Tom Tull, CFA, Chief Investment Officer
Sharmila Kassam, CPA, Deputy Chief Investment Officer
Gabrielle Schreiber, Director of Procurement and Contract Oversight

General Investment Consulting Services



Background

- ERS contracted with Aon Hewitt Investment Consulting, Inc. (AHIC) as ERS' general investment consultant on March 9, 2009.

General Investment Consulting Services

Request for Proposal (RFP)



- ERS issued the RFP on July 6, 2018 for a contract term of six years.
- Requested services include, but are not limited to:
 - Asset Allocation and Asset Liability Modeling
 - Review and Evaluation of the Trust's Portfolio
 - Policy Review
 - Manager Advisory Services

General Investment Consulting Services

Request for Proposal (RFP)



- 32 entities requested access to the RFP.
- Responses were due August 10, 2018.
- The following 6 entities submitted responses:
 - Aon Hewitt Investment Consulting, Inc., an Aon Company
 - Meketa Investment Group, Inc.
 - NEPC, LLC
 - Pension Consulting Alliance, LLC
 - RVK, Inc.
 - Verus Advisory, Inc.

General Investment Consulting Services

Preliminary Review Phase



- ERS' Office of Procurement and Contract Oversight (OPCO) evaluated the following evaluation criteria on a pass/fail basis:
 - Responsiveness
 - Compliance with the RFP
 - All other vendor performance checks required by the Texas Comptroller of Public Accounts

General Investment Consulting Services

Preliminary Review Phase (Continued)



- OPCO also verified the following Minimum Requirements were met:
 - Maintain a business location within North America
 - Maintain a registered agent in the United States
 - Act as a fiduciary with respect to ERS
 - Firm has at least 5 years' experience providing these services to institutional clients
 - Primary individual has at least 10 years' experience providing these services to institutional clients
 - Anticipated revenues from the ERS relationship will not exceed 20% of Respondent's total consulting revenue

All Respondents met the minimum requirements.

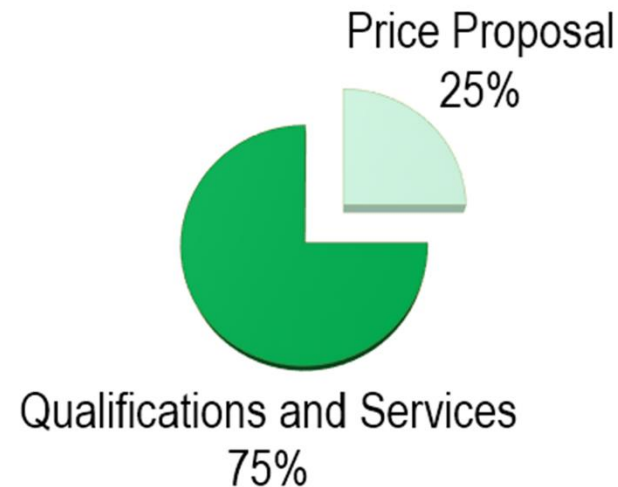
General Investment Consulting Services

Proposal Review Phase



- Two main categories scored:
 - Qualifications and Services
 - *Firm Qualifications*
 - *Staff Qualifications*
 - *Methodology & Soundness of Approach and Optional Services*
 - Price Proposal
- Clarification Questions

Proposal Evaluation Criteria



General Investment Consulting Services



Pass/Fail Items

- Pass/Fail Items
 - Contractibility, including the Scope of Services Requirements
 - Legal Requirements and Regulatory Compliance
 - Financial Stability
 - Past Performance

General Investment Consulting Services

Finalists Review Phase



- Proposal Review Phase culled down the list to three finalists
 - Aon Hewitt Investment Consulting, Inc., an Aon Company
 - NEPC, LLC
 - Verus Advisory, Inc.

General Investment Consulting Services

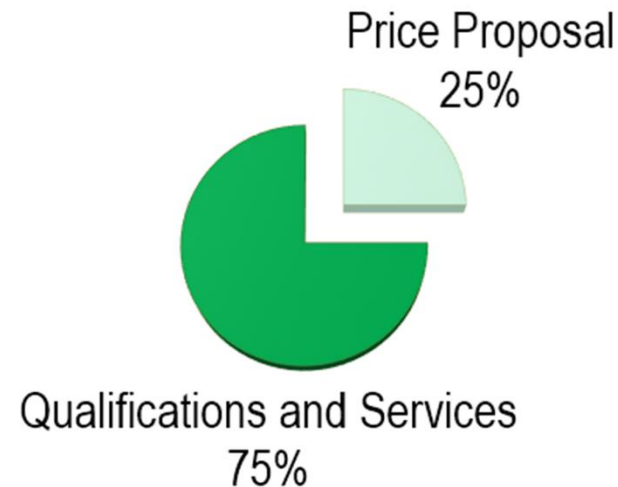
Finalists Review Phase (Continued)



- Finalists Review:

- Qualifications and Services
 - *Face-to-Face Interviews*
- Clarification Questions
- Price Proposal

Proposal Evaluation Criteria



General Investment Consulting Services

Finalists Review Phase (Continued)



- Staff from Executive Office, Investments, Office of General Counsel, and OPCO reviewed the findings of the RFP evaluation team.
- A best-value determination was made.

General Investment Consulting Services

Staff Recommendation



Staff recommends that the Board of Trustees of the Employees Retirement System of Texas award the contract to [_____] to provide General Investment Consulting Services pursuant to a contract which will cover a six year term beginning on or after January 1, 2019.

Questions?
Action Item



Public Agenda Item #10.1

Infrastructure Consulting Services Contract Award and Recommendation – (Action)



December 12, 2018

Tom Tull, CFA, Chief Investment Officer
Gabrielle Schreiber, Director of Procurement and Contract Oversight
Pablo de la Sierra Perez, Director – Infrastructure

Infrastructure Consulting Services



Background

- ERS contracted with Pavilion Alternatives Group Ltd. (previously Altius Associates Ltd.) as ERS' private equity consultant for an initial 3 years beginning August 8, 2007.
- Effective August 1, 2013, the contract was amended to include infrastructure-related services as part of Pavilion's scope of services.

Infrastructure Consulting Services

Request for Qualifications (RFQ)



- ERS issued the RFQ on March 19, 2018 for a contract term of six years.
- Requested services include, but are not limited to:
 - Assisting in the analysis and assessment of funds, co-investments, and other infrastructure investments;
 - Monitoring portfolio performance against the designated benchmark;
 - Assisting and advising the Board of Trustees (Board), the Investment Advisory Committee (IAC), and ERS staff; and
 - Assisting in periodically reviewing ERS' existing policies and procedures and benchmark(s) for the infrastructure program and recommend changes as appropriate.

Infrastructure Consulting Services

Request for Qualifications (RFQ)



- 33 entities requested access to the RFQ.
- Responses were due on April 19, 2018.
- The following 8 entities submitted responses:
 - Albourne America LLC
 - Pension Consulting Alliance, LLC
 - CBRE Caledon Capital Management Inc.
 - StepStone Group Real Assets LP
 - Hamilton Lane Advisors, LLC
 - Townsend Holdings LLC
 - Meketa Investment Group, Inc.
 - Pavilion Alternatives Group, LLC

Infrastructure Consulting Services

Preliminary Review Phase



- ERS' Office of Procurement and Contract Oversight (OPCO) evaluated the following evaluation criteria on a pass/fail basis:
 - Responsiveness
 - Compliance with the RFQ
 - All other vendor performance checks required by the Texas Comptroller of Public Accounts

Infrastructure Consulting Services

Preliminary Review Phase (Continued)



- OPCO also verified the following Minimum Requirements were met:
 - Maintain a business location within North America
 - Maintain a registered agent in the United States
 - Act as a fiduciary with respect to ERS
 - Requisite infrastructure consulting experience of no less than 3 years within last 5 years
 - Primary individual assigned to ERS' account has at least 10 years of infrastructure investment management services and/or infrastructure consulting experience with institutional clients

Meketa Investment Group failed to meet the minimum requirements.

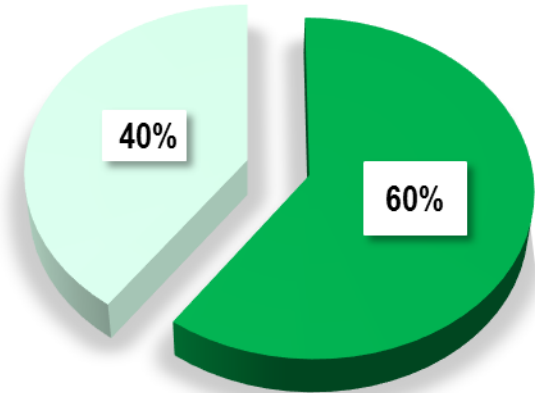
Infrastructure Consulting Services

Statement of Qualifications Review Phase



- Two main categories scored:
 - Firm and Staff Qualifications
 - Methodology and Soundness of Approach
- Clarification Questions

**Statement of Qualifications
Criteria**



- Firm and Staff Qualifications 60%
- Methodology and Soundness of Approach 40%

Infrastructure Consulting Services

Pass/Fail Items



- Pass/Fail Items
 - Contractibility
 - Legal Requirements and Regulatory Compliance
 - Financial Stability
 - Past Performance
 - Site Visits (also scored)

Infrastructure Consulting Services

Finalists Review Phase



- Statement of Qualifications Review Phase culled down the list to three finalists:
 - CBRE
 - Pavilion
 - StepStone

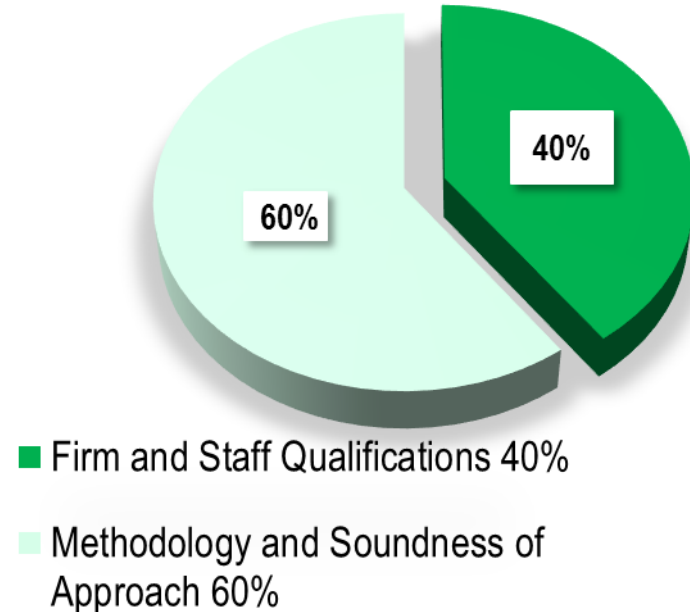
Infrastructure Consulting Services

Finalists Review Phase (Continued)



- Finalists Review:
 - Methodology and Soundness of Approach, and Firm and Staff Qualifications
 - *Face-to-Face Interviews*
 - *Site Visits (also pass/fail)*
 - Clarification Questions

Statement of Qualifications Criteria



Infrastructure Consultant

Finalists Review Phase (Continued)



- Staff from Executive Office, Investments, Office of General Counsel, and OPCO reviewed the findings of the RFQ evaluation team.
- The top-ranked finalist presented “fair and reasonable” pricing.
- Based on scoring and negotiations, a best-value determination was made.

Infrastructure Consulting Services

Staff Recommendation



Staff recommends that the Board of Trustees of the Employees Retirement System of Texas award the contract to _____ to provide Infrastructure Consulting Services pursuant to a contract which will cover a six year term beginning on or after December 12, 2018.

Questions?
Action Item



*Public Agenda Item #11.1

Emerging Manager Program Market Update and Program Overview



December 12, 2018

Sharmila Kassam, CPA, Deputy Chief Investment Officer

Panayiotis Lambropoulos, CFA, FRM, CAIA, Portfolio Manager – Hedge Funds

Emerging Manager Program

Agenda



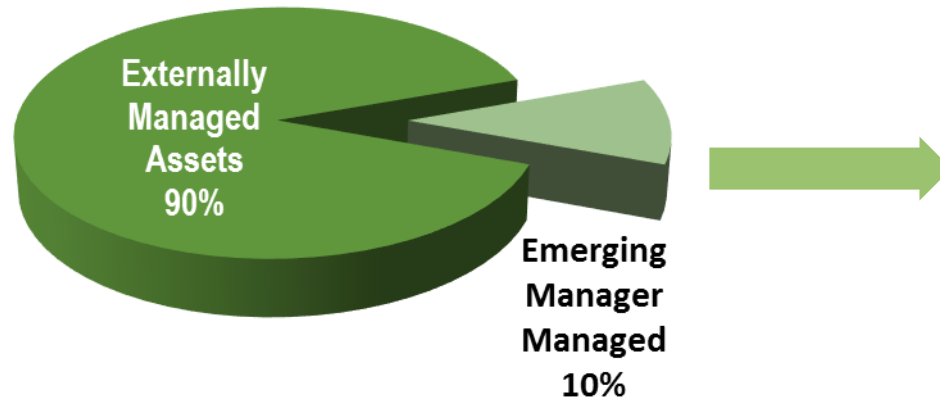
- Background
- Investment Commitments as of June 30, 2018
- Calendar Year 2018 Highlights
- Calendar Year 2019 Initiatives

Emerging Manager Program

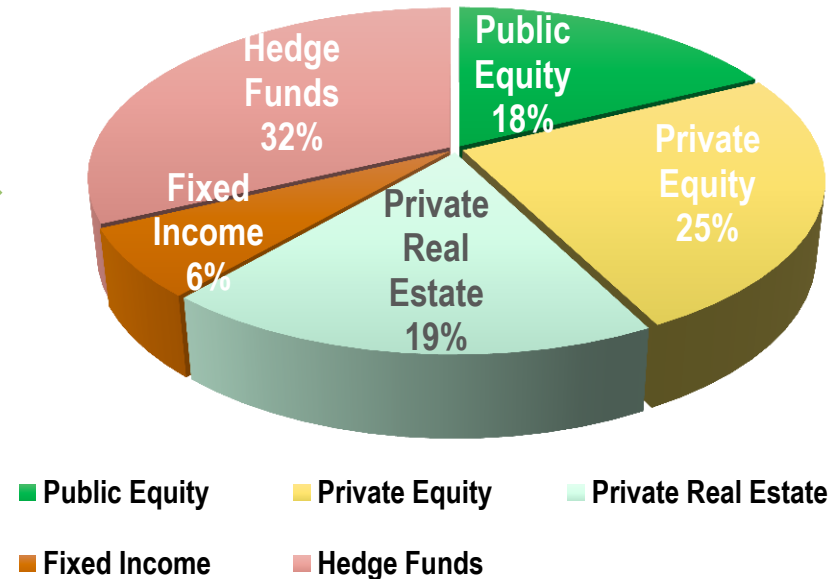
Investments and Commitments as of September 30, 2018



ERS' Total Externally Managed Assets
\$11.6 billion



**Current Emerging Manager
Allocation by Asset Class**



Emerging Manager Program

Calendar Year 2019 Initiatives



- Continue to work on ERS PAAMCO Launchpad
- 2019 ERS & TRS Emerging Manager Conference – February 7, 2019
- Focus on relevant direct relationships with emerging managers in ERS Portfolio
- Promote emerging manager program best practices by working with other investors
- Private Equity emerging manager new fund launch
- Maintain the target of 10% of externally managed assets with emerging managers

Emerging Manager Program

Performance



Private Real Estate	Net IRR (08/31) Since Inception
Total Emerging Manager Portfolio: Inception – December 2010	16.61%
Total Private Real Estate Portfolio	12.87%

Source: The Burgiss Group, LLC

Private Equity	Net IRR (08/31) Since Inception
Total Emerging Manager Portfolio: Inception - November 2010	15.58%
Total Private Equity Portfolio	12.36%

Source: The Burgiss Group, LLC

Global Public Equities	Time Weighted Returns - Gross ¹ Year Ending (8/31)	Time Weighted Returns - Gross ¹ (08/31) Inception – February 2017
Total Emerging Manager Portfolio	8.42%	18.63%
MSCI EAFE Small Cap Net Index	7.46%	16.05%

Source: BNY Mellon

1: Gross returns used as new
mandate has not paid out
annual performance fee

Hedge Fund Program Highlight



Panayiotis Lambropoulos, CFA, FRM, CAIA, Portfolio Manager

ERS/PAAMCO Launchpad Program

Calendar Year 2018 Highlights/2019 Initiatives



- ERS and Pacific Alternative Asset Management Company, LLC (PAAMCO) announced the creation of PAAMCO Launchpad
 - ERS, alongside PAAMCO, created a co-investment platform for seeding and supporting emerging hedge funds
 - ERS is looking to invest today, with tomorrow's successful hedge fund managers
- ERS and PAAMCO hosted an inaugural Forum in New York City
 - Over 200 Managers from around the world applied to attend
 - Forum took place over the course of two days; 35 managers presented

ERS/PAAMCO Launchpad Program

Calendar Year 2018 Highlights/2019 Initiatives



- ERS and PAAMCO are planning to host and present the new venture to other interested allocators
- Given the success of inaugural Forum ERS and PAAMCO may host another Forum
- Continue to review and enhance jointly driven due diligence process
- Target 1-2 initial manager investments

Questions?



Public Agenda Item #12.1

Chief Investment Officer's Report



December 12, 2018

Tom Tull, CFA, Chief Investment Officer

Chief Investment Officer's Report

Investment Division Appreciation



- Appreciation and commendation of IAC for increased time commitments and involvement to include:
 - New Asset Class Investment Committee meeting participation as voting members (37 held during this calendar year)
- Legal has had to intensify their time pressures of current deal relationship maintenance in addition to negotiating new deals
- Investment Compliance augments the Investment Division's efforts for compliance by conducting independent reviews of Investments

Chief Investment Officer's Report

Investment Challenges for Fiscal Year 2019



- Challenging investment environment
- Higher interest rates (Increased divergence between US and Foreign Central Banks)
- Geopolitical and trade risks (NAFTA and China)
- Trust has begun the process of taking risk off (started mid-2018)

Chief Investment Officer's Report

Investment Opportunities for Fiscal Year 2019



- Focus on Directional Portfolio in Public Equities
- Opportunistic Credit Portfolio Development
- GTAA (Global Tactical Asset Allocation) Multi-Asset Class Strategies
- Focus on Infrastructure Portfolio Development
- Ramping up the seeding platform for Hedge Funds
- Enhancement of risk management and risk reporting to Board

Chief Investment Officer's Report

Major Initiatives for Fiscal Year 2019



- Continue implementation of new asset allocation mix
- Review policy benchmarks and education around best practices in industry related to benchmarking
- Support legislative initiatives for addressing unfunded pension liabilities
- Expand existing core competencies for innovative investment management by exploring new investment opportunities
- Refresh select pool of external advisors/managers and initiate searches to refine mix of internal and external management

Chief Investment Officer's Report

Major Initiatives for Fiscal Year 2019



- Assess current and future savings through diligent negotiation of best economic deal terms
- Utilize internal investment expertise and resources to assist investment product monitoring in Texa\$aver Program
- Leverage external relationships for strategic resources and opportunities
- Enhance Investment Division career path development, communication, succession planning and team development
- Completion of Investment Policy Statement project

Questions?



Public Agenda Item #13.1

Adjournment of the Joint Meeting of the Board of Trustees and Investment Advisory Committee



December 12, 2018